THE ARCHITECT & BUILDING NEWS

IN THIS ISSUE

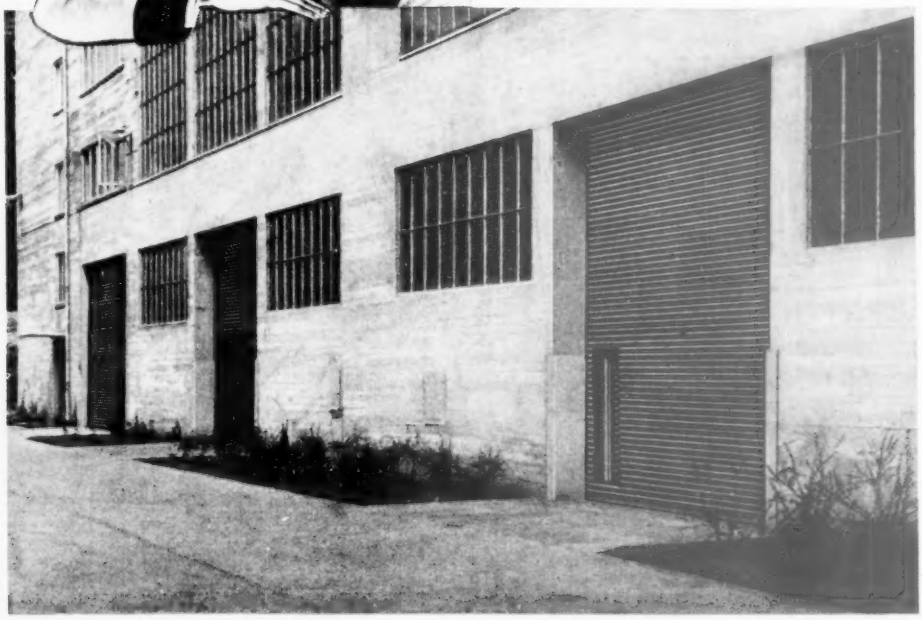
- RESTAURANT IN HAMPSTEAD
- BENTONS LANE HOUSING SCHEME

OCTOBER 9, 1952 · VOL. 202 · NO. 4373 · ONE SHILLING WEEKLY

LIKE BRITAIN...

NORWAY CHOOSES

BRADY



"Brady" is a by-word in most countries now. This installation of three gear-operated steel shutters, incorporating a wicket gate, was supplied to An. Thorbjornsen of Oslo, to give maximum clearance and accessibility at loading points. Whenever it's a question of moving or storing goods and vehicles — quickly, safely, economically — you'll find the Brady organisation has a straightforward answer.

We shutter the world

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Manufacturers of Brady Hand and Power Operated Lifts

BA 30

18 YEARS SERVICE CONFIRMS 1934 TESTS

The illustration above shows part of the bungalows at Chester-le-Street where Cementone No. 7 Primer and Flat Finish was used for the decoration of new cement stucco in 1934. The photograph was taken some 18 years later when the surface was inspected and found to be in sound condition after 18 years exposure. In 1934 tests were carried out by the "Decorator" Journal on all types of surface, including new plaster, new cement and asbestos sheeting. These tests proved the claims made that Cementone No. 7 was suitable for application to almost any type of building surface eliminating the need for specifying special paints for different surfaces. Our claim, first made in 1934, that the "overall" decorative material had arrived, has been confirmed by thousands of contracts in all parts of the world and tests carried out by independent bodies. You would be well advised to specify Cementone No. 7 Flat or Gloss Finish with Universal Primer on your next contract. A Handbook giving specifications and costs per yard will be forwarded on request.

YOU CAN DEPEND ON

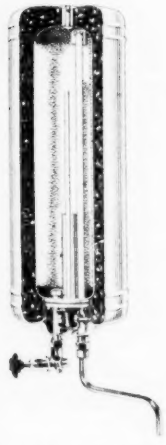
Cementone

JOSEPH FREEMAN SONS & CO. LTD., CEMENTONE WORKS, LONDON, S.W.18

Telephone : Vandyke 2432 (5 lines) *Telegrams : CEMENTONE, WESPHONE, LONDON*

MANUFACTURERS OF COLOURS, HARDENERS **WATERPROOFERS AND DECORATIVE FINISHES**

A



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IT is something more than a series of numbers. B.S.843 is a British Standard specification. G.E.C. electric water heaters conform in every way to this specification and satisfaction in performance is thereby assured.

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TRUE COAL ECONOMY

THE GENERAL ELECTRIC CO. LTD. MAGNET HOUSE KINGSWAY LONDON W.C.2

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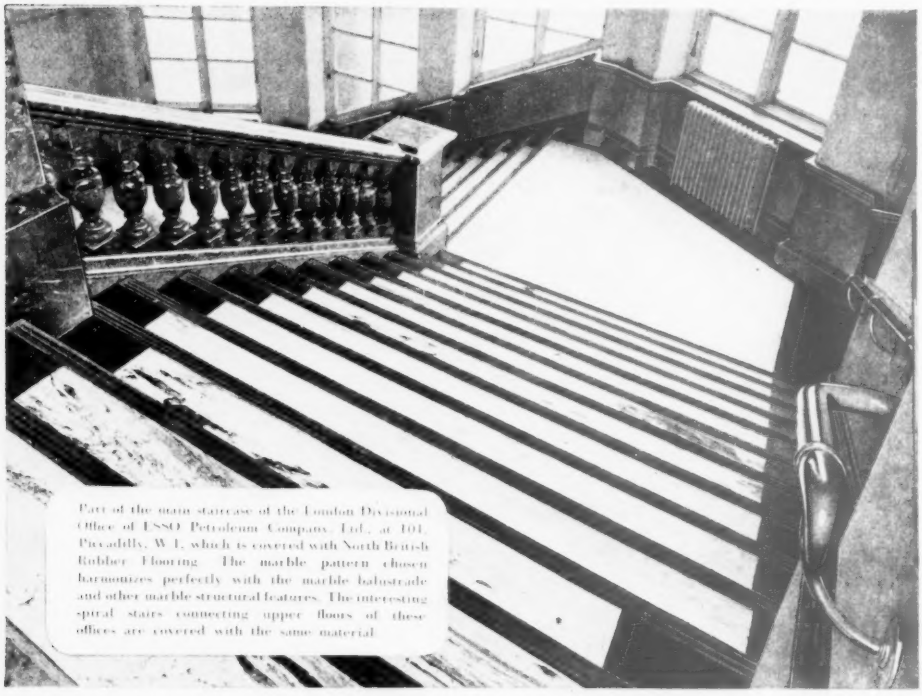
ROYAL BOARD

THE OUTSTANDING ALL WOOD FIBRE HARDBOARD

STANDARD,
OIL TEMPERED (*WATER RESISTANT*)
AND FLAMEPROOFED QUALITIES

1/8" and 3/16" Thick
4' 0" and 5' 3" Wide
Lengths Cut from 18'

★ *The stairs had to be non-slip and safe...*



Part of the main staircase of the London Divisional Office of ESSO Petroleum Company, Ltd., at 104, Piccadilly, W.1, which is covered with North British Rubber Flooring. The marble pattern chosen harmonizes perfectly with the marble balustrade and other marble structural features. The interesting spiral stairs connecting upper floors of these offices are covered with the same material.

...and to harmonize with handsome marble structural features

so

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In thousands of Britain's largest buildings, our rubber flooring has been laid. We undertake the laying, if desired.

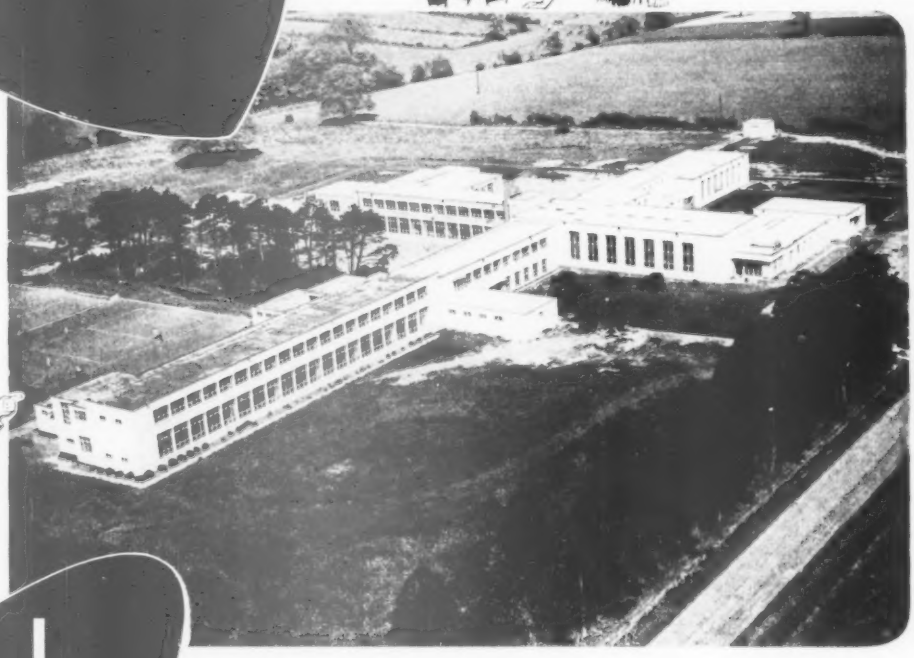
THE NORTH BRITISH RUBBER COMPANY LIMITED — EDINBURGH AND LONDON

131

Specified for the following Cumberland County Council Schools :

Wigton Secondary Modern School.
Maryport Primary School.
Brampton Secondary Modern School.
Belah Junior School.

Emalux
REGD TRADE MARK
GLAZED CEMENT WALL FINISH



Wigton Secondary Modern School. Architect: John H. Haughan, F.R.I.B.A.

Emalux **carries the day in Cumberland**

Cumberland County Council recognise the merits of glass-hard Emalux for school decoration. This permanent wall finish is not expensive—and first cost is the last, for the walls are likely to crumble before Emalux shows sign of wear. It is attractive—glowing colours that never fade, a non-dazzle light-reflecting glaze that is quickly cleaned with soap and hot water. It can be applied by skilled Emalux craftsmen on almost any wall.

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The Board Room, The Jaegar Co., Ltd., London. Architect: Eugene C. Kent, F.R.I.B.A., M.T.P.I. The furniture and furnishings were supplied by Heal's Contracts Ltd., to the order of the architect. Sapele, cross-banded with sycamore, was used in the making of the table top. The legs are of stained beech, and the chairs are covered in Heal's Welsh wool tweed. A grey Wilton carpet and curtains of lime-yellow linen complete the scheme.

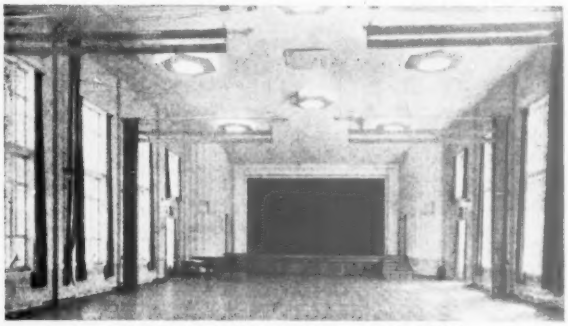
HEAL'S CONTRACTS LTD

196 TOTTENHAM COURT ROAD, LONDON, W.1 Telephone: MUSEUM 1666

Hangers *NEW* Emulso-Plastic Paint

FABRIGUARD

was chosen here . . .



Nottinghamshire County Training College, Eaton Hall, RETFORD.

Photograph by permission of E. W. Roberts, Esq., F.R.I.B.A., County Architect.

Contractors: Messrs. William Moss & Son, Ltd., Loughborough.

FABRIGUARD, in clean pastel colours, was used on the walls of the new Assembly Hall. Because **FABRIGUARD** can be used on NEW work after only *two weeks* decoration of ceiling and wall surfaces can be completed while scaffolding is still in place, thereby allowing other work to proceed later without interruption. Rapid drying makes it possible to apply more than one coat in a day if necessary. **FABRIGUARD** surfaces, both flat and *Porcelain Gloss*, are fully washable.

Floralac Hard Gloss Enamel Paints was used on wood surfaces and metal window frames on the above contract.

FABRIGUARD, the remarkable new Emulso-Plastic Paint, is resistant to the destructive action of Alkali in new plaster, cement, asbestos cement or brickwork, and is acid resisting. **FABRIGUARD** dries quickly to a rubber-like film, and is scrubbable only 24 hours after application. Usually only 4 hours is necessary between coats, so several coats can be applied in one day. **FABRIGUARD** is easily applied with a distemper brush, or can be sprayed. It saves substantially on labour costs, and can be applied after rendering months earlier than ordinary paints.

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- Old Plaster
- Hardboard
- Softboard
- Wood
- Creosoted Wood
- New Cement
- Old Cement
- Asbestos Cement
- Brickwork
- Roofing Felt
- Non-ferrous metals
- Limewash
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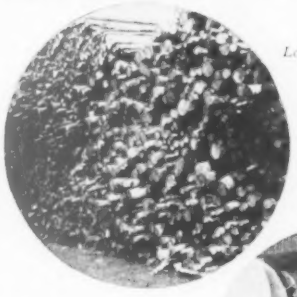
WE IN BRITAIN PRODUCED THE FIRST BUILDING BOARD IN 1898

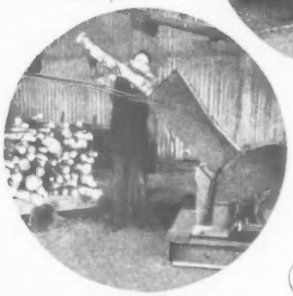
We still make the best board in 1952

Logs arrive at the Sundeala Factory

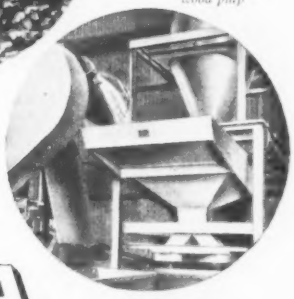
Log pile



Converting logs into chips



Grading chips prior to conversion into wood pulp



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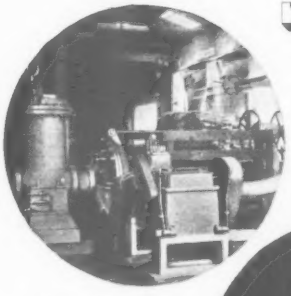
BUY BRITISH

SUNDEALA

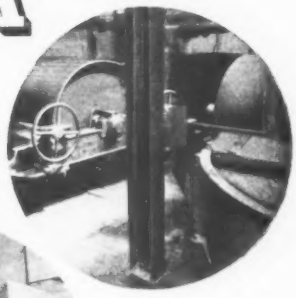
HARDBOARD

MEDIUM HARDBOARD

INSULATION BOARD

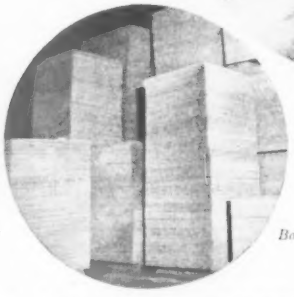


Converting wood chips to wood pulp



Beating the wood pulp

Sundeala boards can be bent to shape



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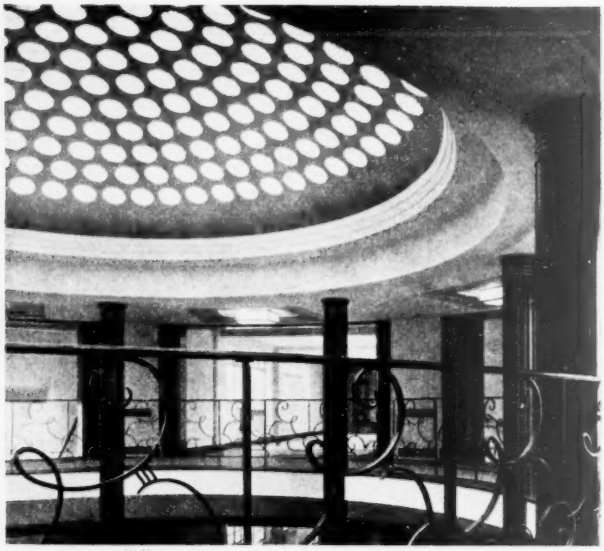

A DOME in GLASCRETE

Reinforced Concrete and Glass

at

The Royal Sailors Home Club

PORTSMOUTH

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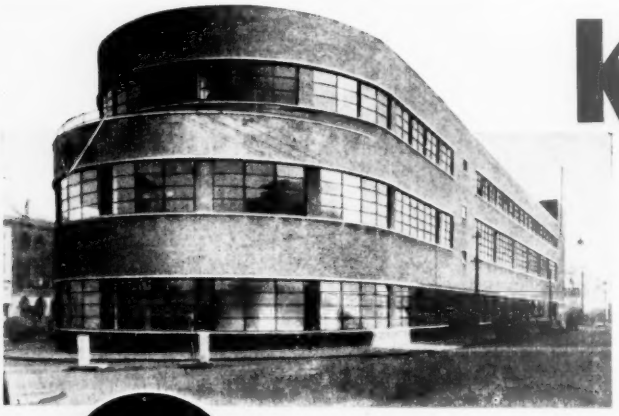
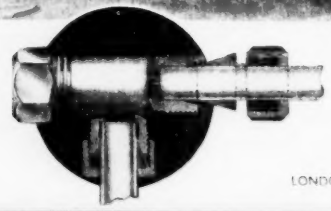
Architects desiring further information on the uses and potentialities of GLASCRETE should write for our interesting Brochure P 30





Our illustration shows the recently erected G.P.O. Sorting Office at Nottingham which was installed throughout with Kontite Compression Fittings.

Kontite COMPRESSION *fittings*

THROUGHOUT

Kontite Fittings have long maintained a leading place in the field of compression jointings. Their popularity is founded on their ease of assembly, their adaptability and the reliability which is ensured by the use of the highest grade materials in the hands of fine British craftsmen.

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am K.B. 67

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(LEE-McCALL SYSTEM)
WITH MACALLOY BARS

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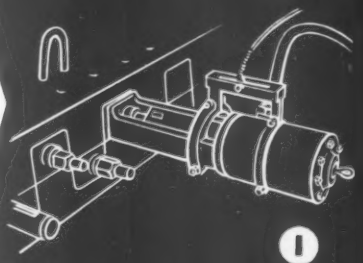

1

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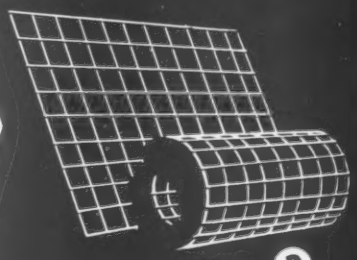
Economical for all types of concrete construction. Hard drawn, high tensile steel wire mesh, electrically welded at every intersection; permissible working stress 27,000 lb. per sq. in. in tension.



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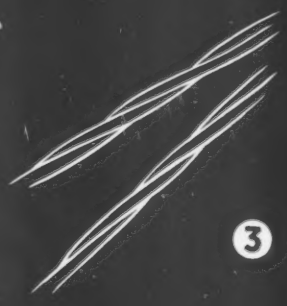

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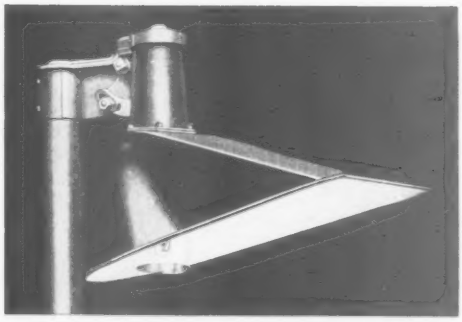
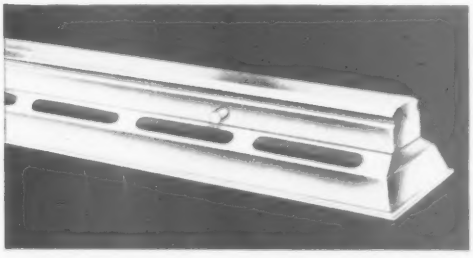
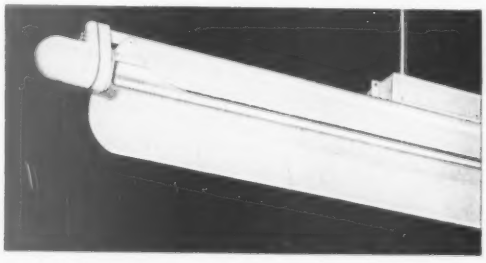


THE DUOFLUX fitting for floodlighting works yards and roadways. For Filament 300-1500 watts or Mercury vapour lamps 125-400 watts. Heavy Vitreous Enamelled body and Anodised Aluminium Reflector. Filament 300w **£13 . 0 . 0** Mercury 400w **£21 . 2 . 0**



B 7832 Vitreous enamelled reflector slotted for upward light, variable suspension centres, plug and socket connection. **£8 . 14 . 5**



AV 1113 The most successful fitting yet produced for use in steam or corrosive vapour. For 5ft. 80 watt lamp.
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CONCRETE & ASPHALTE
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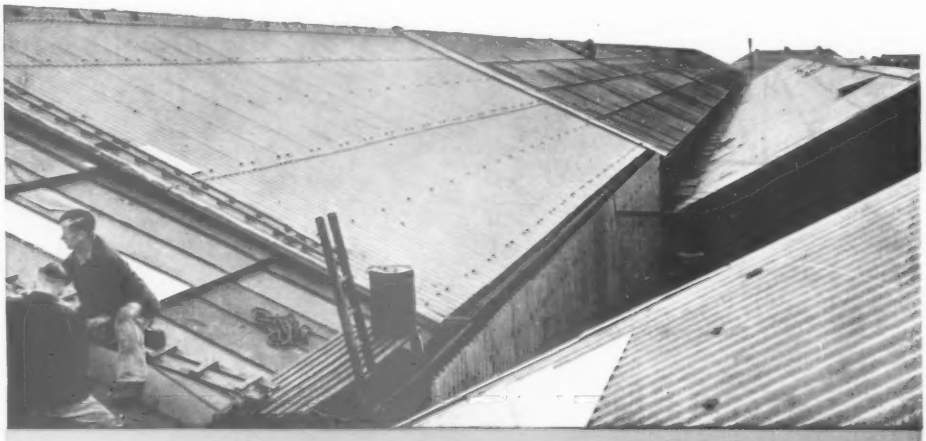

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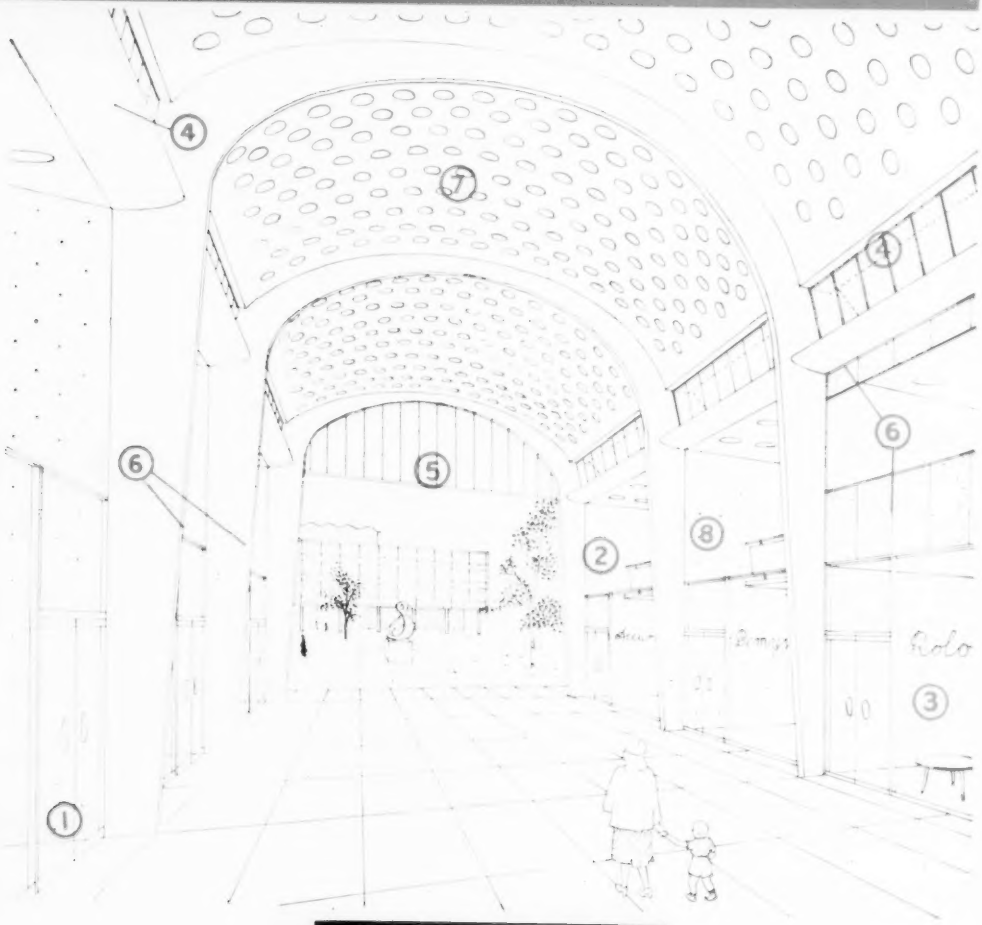
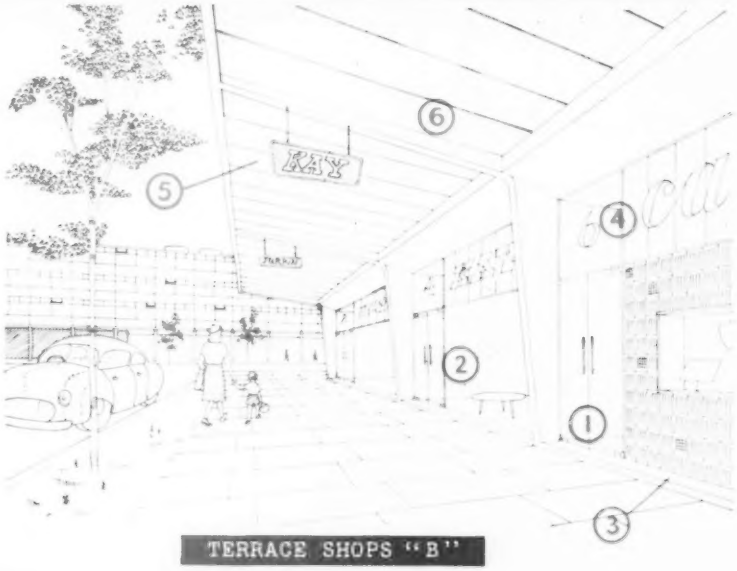
GLASS NEWS



SHOPPING ARCADE "A"

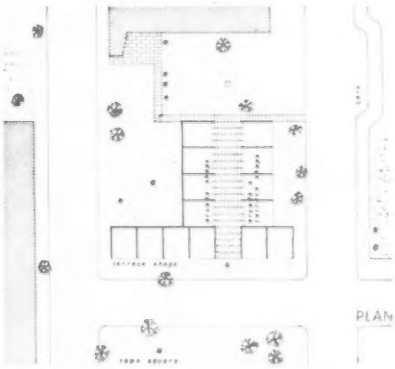
1 Standard "ARMOURPLATE" glass doors.
2 Polished Plate glass mezzanine windows.
3 Polished Plate glass lower windows.
4 Diffusing or refracting glass clerestory lighting.
5 Polished Plate glazing.
6 "VITROLITE" panelling to first floor shop.
7 "ARMOURLIGHT" glass lenses in barrel vault roof.
8 Wall surfaced with Silvered Polished Plate glass.

STRUCTURAL AND DECORATIVE USES OF THE MATERIAL



TERRACE SHOPS "B"

1 Standard "ARMOURPLATE" glass doors.
2 Polished Plate glass windows.
3 "INSULIGHT" Hollow Glass Block front to cosmetic shop.
4 "VITROLITE" fascia.
5 "VITROLITE" names panels.
6 Georgian Wired Cast glass in canopy.



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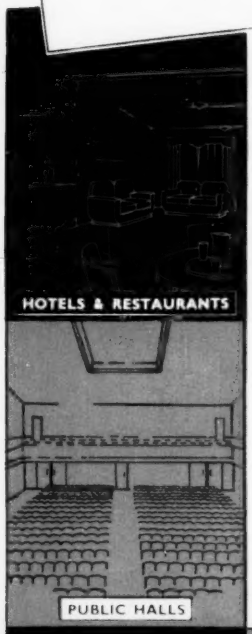

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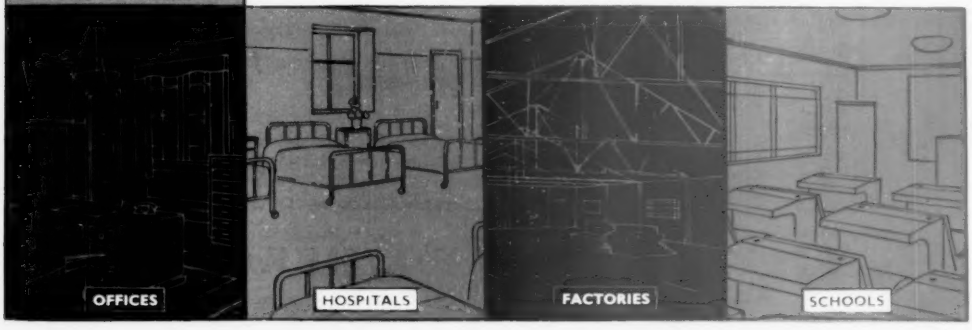

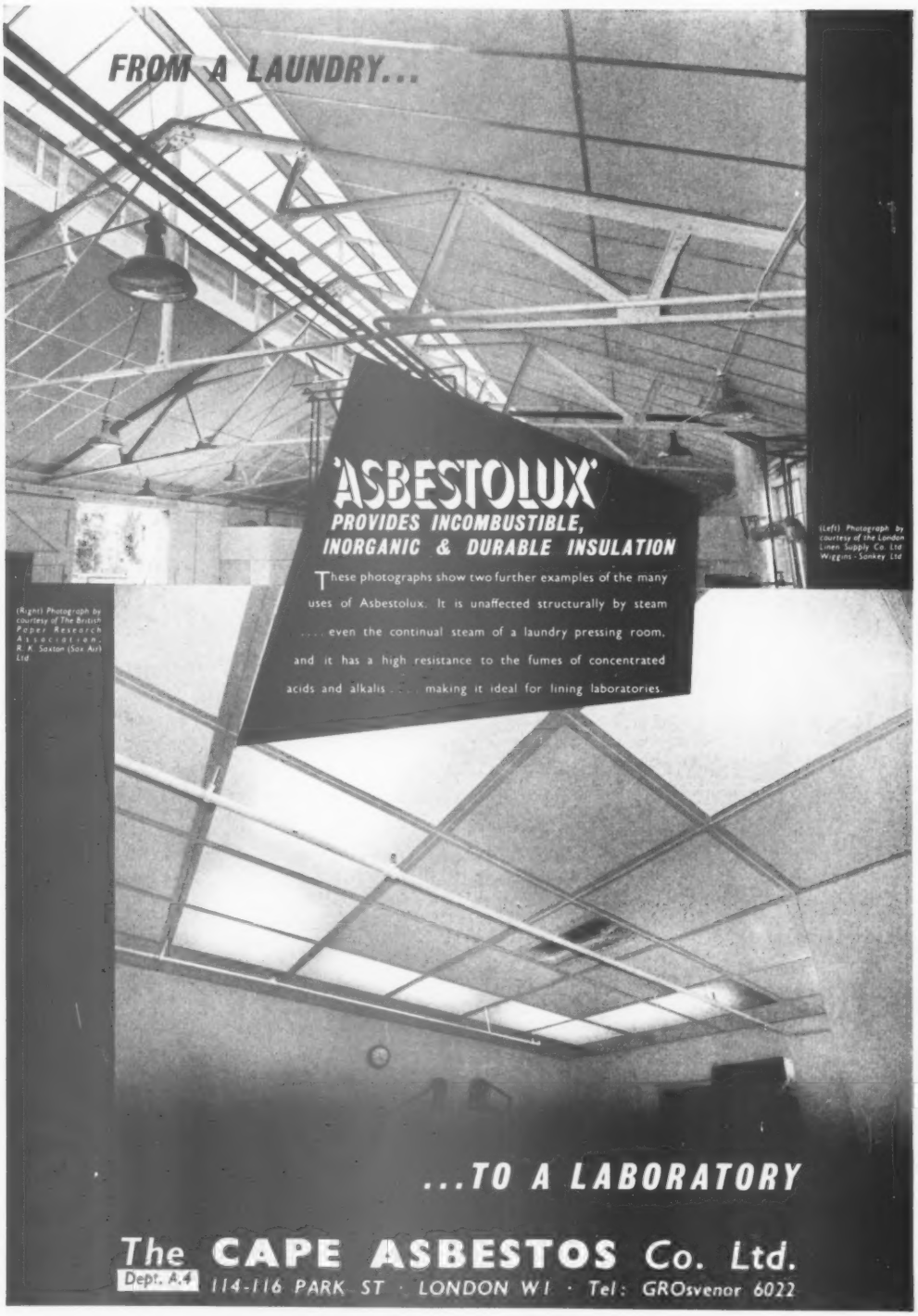
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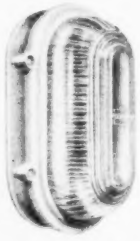

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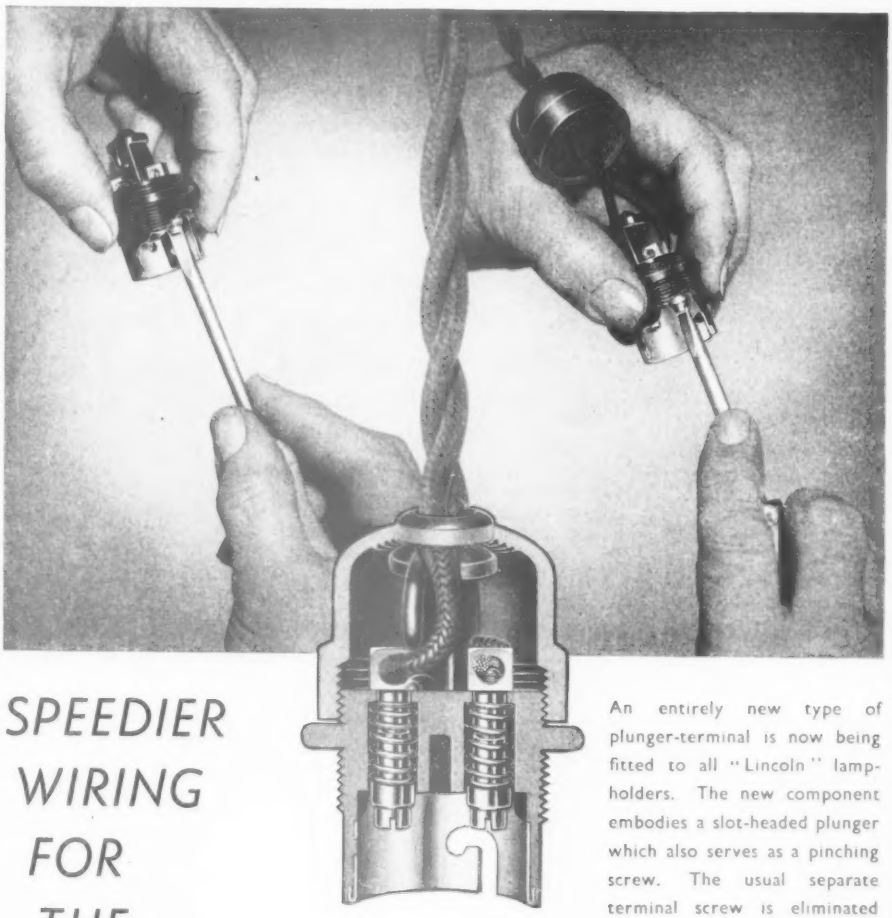

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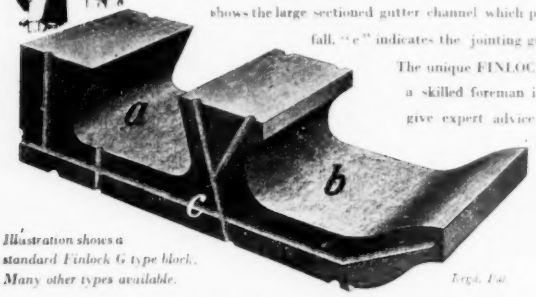

Illustration shows a standard Finlock G type block. Many other types available.

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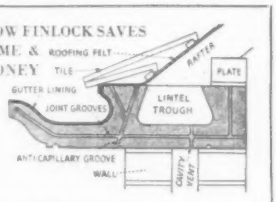

This sectional drawing shows the system in detail and illustrates the ways in which FINLOCK saves approx. 5 yards of brickwork, 80 ft. of rafter, 40 ft. of normal guttering, 40 ft. of fascia, 40 ft. of soffit and 80 ft. super of roof tiling per single house. Painting is eliminated and a reduction in down pipes and drainage is obtained. The complete eaves for a building, with all fittings, can be fixed in one day.

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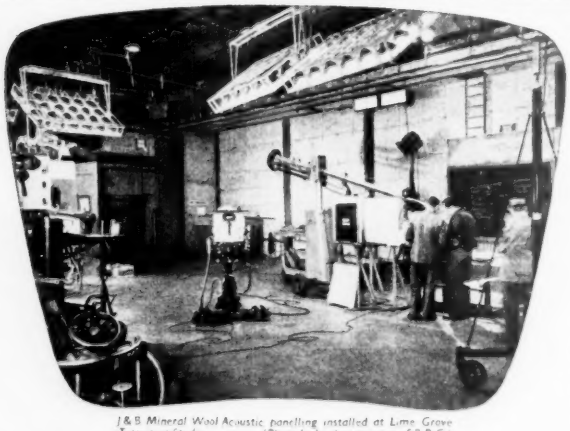

J & B Mineral Wool Acoustic panelling installed at Lime Grove Television Studios. (Photo by kind permission of B.B.C.)

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Vol. 202 No. 4373

THE ARCHITECT & BUILDING NEWS

October 9, 1952

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MORE HOME TRUTHS

THE problems of the decay of pre-war dwellings, methods of coping with obsolescent houses and of the relations of these problems to the general post-war housing problem are still no nearer solution. We doubt, indeed, if they are much nearer comprehension even by those whose technical or political knowledge should lead them to understanding.

These problems must be taken in hand; first by realizing that they exist (enough people do not yet) and then through such realization by asking the right questions about them (many investigations come to nought because a premiss is wrong or the question initially posed is irrelevant). This sort of questioning must be accomplished from a basis of fact and not one that is founded on political bias or a hope of political or financial gain by a section of the community (it may be that these are the reasons the problems are talked about so much without resultant action). Secondly a basis of fact implies knowledge through patient examination of existing conditions, technological and economic surveys which must not be confined to one side of the problem but which must find the real relationships between all sides.

We set out this somewhat platitudinous preamble because it would seem essential as a prelude to noting what is actually happening. Broadly it is as follows: the Government is pursuing its political objective of 300,000 new permanent houses per year, but at what expense to other sides of a balanced building programme is somewhat obscure; but, if some are to be believed, certainly school and welfare programmes are suffering. Houses for sale are still a small minority in this drive and therefore subsidized houses let for uneconomic rents are the main results. In other words, the greater number of houses now being built will cost the community, over the subsidy period of sixty years, something like three times their initial cost. At that future time presumably some other administrators will have the headaches, and will be saddled with a vast number of obsolescent houses requiring the same amount of maintenance and repair that many pre-war houses now require to keep them as useful dwellings. To deal now with the latter, there is a pseudo-political movement to amend the rent restriction acts to enable landlords (Local Authorities being exempt) to raise rents for the purpose of paying for repairs. Any move in this direction is doomed from the outset, for increases in rent will produce payment-resistances and, in any case, cannot be made so large as to remedy the neglect of twelve years or meet the cost of more up-to-date amenities in obsolescent houses. What are called reasonable increases would probably mostly find their way direct to landlords' pockets and the relief to the housing problem would be negligible, taking the country as a whole.

What emerges from all this is that the annual increment of new houses will not alone meet the problem except over a fantastically long future, because, even at the present rate of building, it cannot get much ahead of population increases and movements and the losses due to decay of old property. In addition its cost is, considering the present economic standing of the nation, much too high, both in first cost and over a long term. It seems obvious, therefore, that something must be done to existing dwellings, wherever possible, as an essential factor in meeting the over-all problem. To do so implies a change of policy, practical and economic; it also implies a change of heart and the use of intelligent planning.

To deal with the decaying centres of our larger towns and the obsolescent dwellings of their inner rings requires detailed surveys of existing conditions and methods of attack that can only be practical if the project is taken in hand as a national problem, initiated by the central government, administrated by the local authorities and also if adequate subsidies

or grants are provided to meet even some of its cost.

Any such programme of repair and maintenance must be realistic; not only must it be planned in proper perspective and with relationships to new developments, but it must be related to the future planning of central areas, including the preservation of buildings and layouts of architectural worth. It must be regarded, in many areas, as an interim procedure and time limits must be imposed by licence on many properties so repaired. Much of the work can then be treated as a sort of high-grade first-aid, with a definite life, to be reviewed later.

The very heart of the matter is realization that the problem of housing in this country at this time is an all-round problem. That all factors, whether rents, repairs, maintenance and improvements of existing dwellings, or new houses or new towns and the relation of these to other developments and to costs, must be reviewed and integrated before any adequate progress towards a solution is made. This means that scientific planning will be required on a nation-wide front. The surveys forming part of the Town Planning Act development plans now before the Minister can well form a start for this work, but they are not detailed enough for it to be carried very far.

Sectional attacks or those with partisan biases will leave the problem in the political ditch, where it may be snarled over for generations. Atom research seems to have been integrated, why not housing the people?

EVENTS AND COMMENTS

GOOD CLASS DETACHED

I give below part of a letter which appeared over the signature "Builder" in the *Manchester Guardian* for September 27.

"Sir,—The letter from Mr. W. O'Reilly on September 22 prompts me to put another point of view before your readers besides that of the Architect's whose ideas have been rammed down our throats for as long as I can remember.

"Since serving my apprenticeship to the trade I have had thirty years' experience in building houses, and I have built quite a lot in the district in which I was born. I can still live here in comparative peace and meet my old clients as friends, although very few of them employed any architect to supervise me and most of them consider their houses as nice to look at and as good as any others. Many of the houses are good-class detached. It costs anything from 6 per cent upwards to employ an architect for supervision, and to my mind it is a sheer waste of money on a house of, say, less than 1,250 super feet of floor area. Employ one to draw your plans if you like, but let it stop at that. With local authorities employing their own architectural staffs and housing and town planning committees, there is no reason why any house should be built with a bad plan or elevation these days. As for supervision, what are building inspectors for?

"My experience of architects is that their technical knowledge (of house-building) has generally been inferior to my own, that they will sacrifice convenience to get a "pleasing and balanced elevation," such as comparatively small windows which have to conform with their ideas of proportion even at the expense of poorly lit rooms. Who but architects are responsible for the silly, horizontal bars across windows, obstructing the vision, providing unnecessary leakage and maintenance points, but providing "pleasing lines," &c.? I think every architect ought to spend a year or two working on the job. Top-class architects, of course, rarely spend any time on small houses.

"My advice to prospective house-builders would be to get an architect to draw your plans, get reputable firms to tender if you want a good job, and newly established firms if you are willing to take some extra risk for a lower price."

In spite of his contempt for architects I notice that the writer does not give his name. Perhaps he considers that that would be too much like burning his boats. His letter is nevertheless a mixture of ignorance and mis-directed sense. He does not know, for instance, how the architect's scale of charges is calculated, nor does he seem to realize that for the client supervision is the least expensive part of the architect's services. He suggests that the local authorities with their architectural staffs and building inspectors are responsible for designing and supervising the construction of houses put up by private builders. If "Builder" has thirty years' experience of house building it seems only natural that he should find some architects with less technical knowledge of house building than he has but that does not say that he does not require supervision in carrying out architect's instructions. It is all very well to jeer at "pleasing lines" but there are all too few pleasing lines in the domestic architecture of Manchester and if an architect can turn a rabbit hutch into something pleasant to look at as well as to live in by moving a window here or there he should not have to justify himself to foolish letter writers. Horizontal glazing bars may still be fashionable among some Manchester builders but most people gave them up long ago. They were anyway a transition from cottage casements to uninterrupted glass areas. On one point only do I agree with "Builder," and that is that every architect should have a spell of practical training on the job. The idea of having an architect to draw the plans and a builder to carry them out is a rather expensive variation of the Australian scheme mentioned on this page three weeks ago. I have no doubt that "Builder" would love such a scheme. You may think as I do that "Builder's" letter was so stupid as hardly to require an answer, but as it appeared in one of our great daily newspapers it was necessary to draw your attention to it at some length.

WILL YE NO COME BACK AGAIN?

Although as yet no official announcement has been made it seems to be true that Robert Matthew, architect to the L.C.C., is leaving to take up the appointment of Professor of Architecture at Edinburgh University. I hear that he will not go until the inquiry into the Greater London

Plan is completed and no one seems to know when that will be. A lot of things have happened since Robert Matthew joined the L.C.C. in 1936. The Royal Festival Hall has been designed and built, L.C.C. housing has passed from the valuer to the architect, and many revolutionary schemes have appeared on paper; a number of comprehensive schools have been planned, and, one way and another the L.C.C. architects' department has come to be regarded as one of the most lively places in the architectural world. Everyone will therefore be sorry to hear that Matthew is leaving. His reasons, I guess, are connected with the amount of administration he has to do and the fact that he cannot carry on his private practice. He has, I believe, a family practice in Edinburgh to which he can return and he strikes me as a man who is temperamentally well suited to occupy a chair of architecture. We shall all miss him. We may therefore, with confidence, wish him happiness in his new venture.

The question of a successor at once presents itself and here the L.C.C. is faced with the usual problem. If it chooses an outstanding designer and there is one obvious choice close at hand he may soon tire of the red tape and committees. He will anyway have insufficient scope for his designing talent. I believe that there are in the profession a number of men who would make first-class administrative architects and like the job, although they are not designers of the top class. The type of person I am thinking of is an architecturally qualified Frank Pick and although no one of such supreme stature might be found I believe that the L.C.C. would be well advised to try that approach rather than the one of the brilliant architect who in no time at all would feel frustrated.

CENTENARY OF ANTONIO GAUDI

The architect of that remarkable building, the Church of the Holy Family, Barcelona, was born a hundred years ago, and to celebrate the event a society known as the "Amigos de Gaudi" is organizing a competition. This competition is for the best published or broadcast work on Gaudi produced in any country and in any language between June 25, 1952, and March 31, 1953. I imagine that Professor Pevsner's broadcast talk given earlier this year and published in the *Listener* for August 7 will stand a chance. The Church of the Holy Family is, of course, unfurnished, but I had not realized until I heard Professor Pevsner that the main tower was to have been over five hundred feet high, and that only about an eighth of the building was ever begun.

THE HENRY VIII WINE CELLAR, WHITEHALL GARDENS

You will remember how the Wine Cellar, originally at ground level and forming part of the Tudor palace of Whitehall, was moved all over the shop to make way for the current Government gorgeousness in Whitehall Gardens. Parliament, it appears, gave an undertaking before the war that in any reconstruction scheme the cellar would be preserved. The building, which weighs something like a thousand tons, was moved, in all, about seventy-six feet laterally and lowered nearly nineteen feet. This was nice work, and it seems to me a great pity that similar treatment on a far larger scale could not have been meted out to the whole of the new building. You may, if you wish, visit the wine cellar. Write first to the Secretary (AS8L), M.o.W., Lambeth Bridge House, S.E.1.

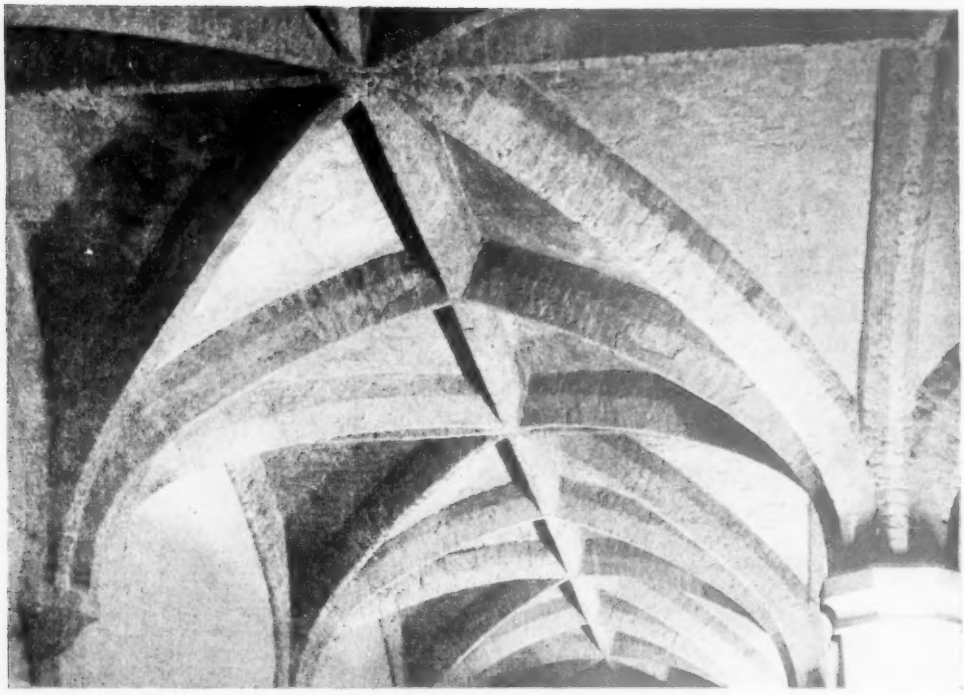
THE ARCHITECTURAL YEAR

If you are disposed to attend R.I.B.A. functions you will note that the general meetings arranged for the session are more than usually attractive, even the Science lectures appear less grim than usual. One cannot help feeling that the changes are in deference to the humane qualities of the President. No doubt we shall soon be bidden to the A.B.S. Ball, but let there be no mistake this time about the amount of time devoted to dreary cabaret and ghastly prize distribution. Let us please have more dancing and less blurb. I do not believe that the receipts will suffer if the amount of time given to the charitable part of the dance is reduced. But, please, no cabaret, and no actresses, however beautiful, or I won't come.

I understand that some people are trying to make the Annual Conference a more worthwhile affair by increasing the working part to rather more than a couple of speeches of merely sufficient importance to justify official architects claiming their expenses. A slight flutter has, however, been caused by the sale of the only hotel in the district large enough to accommodate the banquet.

Remembering the depressing atmosphere at the revived annual dinner last year at Grosvenor House, may I respectfully draw the attention of the R.I.B.A. to my comment on this page at the time, in which, among other things, I pointed out that such a dinner is only worth holding if one can do it at home, and everyone knows that that is possible, even if numbers are restricted.

ABNER



Detail of the vaulting in the Henry VIII Wine Cellar, Whitehall Gardens

NEWS OF THE WEEK

Princes Meadows Estate

The Town Planning Committee of the L.C.C. have recommended the Council to purchase from the Duchy of Cornwall an area of about 35 acres between Waterloo Bridge and Broad Wall with a river frontage of a quarter of a mile. The cost would be £1,450,000. The Treasury have given their authority to the necessary loan and have taken note of the fact that the L.C.C. is recommended by its Town Planning Committee to approve in principle the reservation of a site of about 5 acres for a science centre which would include accommodation for learned societies, the Patent Office and the D.S.I.R.

L.M.B.A. Medals

The Minister of Education, Miss Florence Horsbrugh, M.P., and the Minister of Works, Mr. David Eccles, M.P., are to attend the presentation of the L.M.B.A. medals by His Royal Highness the Duke of Edinburgh in the Mansion House on November 5.

Housing Progress

The number of permanent houses completed in Great Britain during the month of August was 17,821, compared with 14,741 in August, 1951.

During the three months ended June 30 last, the L.C.C. completed a further 2,166 dwellings, bringing the total of new permanent dwellings completed since the war to 43,295.

COMING EVENTS

Institute of Landscape Architects.

October 16 at 6 p.m. Meeting of the International Federation of Landscape Architects and the Stockholm Conference: illustrated report by Brenda Colvin, P.I.L.A., Judith G. Ledeboer, A.R.I.B.A., F.I.L.A., and H. F. Clark, F.I.L.A., at the Housing Centre, 13, Suffolk Street, S.W.1.

Royal Institute of British Architects.

October 14-31. Mondays to Fridays 10 to 7, Saturdays 10 to 5. Exhibition of Irish Architecture at 66, Portland Place, W.1.

Physical Society—Acoustics Group.

October 13 at 5 p.m. Science Meeting of the Group. Lecture to be given by Mr. A. T. Pickles entitled, "Acoustics in America," in the Lecture Theatre, Science Museum, Exhibition Road, S.W.7.

The Royal Sanitary Institute.

October 15 at 2.30 p.m. London Sessional Meeting. Paper on "The Efficiency of Domestic Solid-Fuel Appliances," by W. F. B. Shaw, B.A., Chief Physicist, Fuel Research Station, Department of Scientific and Industrial Research, at 90, Buckingham Palace Road, S.W.1.

Victoria and Albert Museum.

October 15 at 6.15 p.m. Lecture on "Victorian Painting," by Graham Reynolds, Deputy Keeper in Charge of Paintings, Victoria and Albert Museum, at South Kensington, S.W.7.

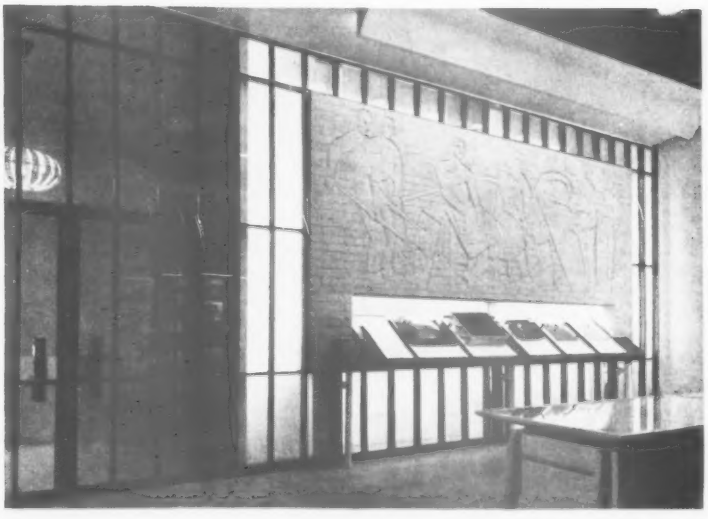
WILL

Mr. Frank Atkinson, of Langroyd, Park Road, Bingley, architect and surveyor, surveyor of the Bingley Building Society, and a former chairman of Bingley Urban Council, left £38,401 (net £38,155, duty paid £8,063). He left his share and interest in the partnership practice of architects and surveyors carried on at Barclays Bank Chambers, Bingley, to his partner, Mr. Eric O. Robinson, A.R.I.B.A.

CORRECTION

The general contractor for McIlroys New Store, Portsmouth, was Jno. Croad, Ltd., and not J. Croad, Ltd., as printed.

A new permanent exhibition of household equipment by Allied Ironfounders Ltd. was opened last week at 28 Brook Street, W.1, by Mr. David Eccles, M.P., the Minister of Works. Views of the exhibition, which includes an unusually wide range of low cost appliances, are shown here.



A.B.T. Resolution

The following resolution, sponsored by the Association of Building Technicians, was passed unanimously by the Joint Executive Councils of unions affiliated to the N.F.B.T.O. meeting in York on September 26, 1952:—

"This joint meeting of Executive Councils of unions affiliated to the N.F.B.T.O. deplores the decision of the Government to reduce the staff of the Building Research Station which will result in a serious curtailment of the work of the main research organization available to the building industry at the present time.

"The proposed reductions represent an infinitesimal saving compared with the total annual expenditure on building and cannot be justified on grounds of common sense or economy.

"A full and continuing programme of research is essential to achieve greater efficiency in the industry and to develop its resources to meet modern needs, and we call upon the Government to reverse its present policy in order that the programme of research undertaken by the Building Research Station may go forward unimpaired."

Academic Development Committee York Civic Trust

Short Report on the 1952 *Summer School of Architectural Study*

THE fourth annual York Summer School of Architectural Study has recently been held at St. John's College, York, and there can be no doubt that it has been the most successful one to date.

It was attended by 48 students from all over Britain and included 8 students from overseas (Sudan, Malaya and West Africa). These York Summer Schools are achieving such wide popularity and recognition that the numbers attending this year's School were considerably in excess of those originally envisaged.

The work this year followed along the lines of previous Schools, particularly the one for last year which embodied certain improvements. For the purposes of study, the students were divided into four groups, each under the guidance of a tutor, and they spent the mornings and afternoons of each day measuring, sketching, photographing and studying buildings of their own choice. A wide range of subjects was encompassed, ranging from complete studies of, for example, the Minster Chapter House, to such minor details as staircases, fireplaces and furniture.

Each evening there was a lecture by a notable person on a subject directly connected with or closely allied to architecture. The lecturers included Miss Dorothy Stroud on "18th-Century Landscape Gardening," Geoffrey Webb on "Decorated and Perpendicular Architecture," Professor Rudolph Wittkower on "Burlington and his Work in York," Dr. Thomas Howarth on "L'Art Nouveau and the Modern Movement," Miss D. Sylvester on "The Northern Village—Evolution and Decay," John M. Holmes on "Decorative Expression in Architecture" and H. Cadbury-Brown on "Movement and Architecture."

In addition there was an all-day coach visit to Harewood House, Byland Abbey, Helmsley Castle, the village of Nun Monkton and the Saxon Church of Kirk Hammerton. A film evening was also included and a varied programme of 16mm sound films was shown. This consisted of "Colour" by I.C.I., "The City" and "Houses in the Town" by the C.O.I. Another interesting item was the lecture given by Mr. G. Willmot, Curator of the York Philosophical Society's Museum, on his recent excavations at St. Mary's Abbey, York. This was given on the site of the excavations and included a visit to the very fine collections of mediæval sculpture in the museum.

A total of 30 guineas has very generously been offered to the School by various persons and local societies as prizes. The subjects for competition are measured drawings, architectural sketches and illustrated essays.

The 1952 Summer School was both an interesting and a happy one. The quality of the students who attended was of a high order. Now that these Schools are firmly established as an annual event, there seems no reason why they should not continue to prosper and attract architectural students of high quality from all over the world.

The 1953 Summer School of Architectural Study has been arranged for August 8 to 22, 1953, at St. John's College, York, and the prospectus for it will be available early in the year. An additional feature will be a special section of the School allotted to town-planning students.

Land Requirements in Residential Areas

A handbook entitled "The Density of Residential Areas," produced by the Ministry of Housing and Local Government, is published to-day (H.M.S.O., price 5s). This handbook, which is extensively illustrated with plans and photographs, deals with the problems of the amount of land required for different projects in residential areas, and in particular for housing.

In a foreword to the book the Minister of Housing and Local Government, Mr. Harold Macmillan, states:—

"In putting out this book I am not intending to suggest that desirable standards must be cut; but rather that, with more flexible ideas about the use of terraces and with better layout, land can be saved without any sacrifice of desirable standards." The book includes chapters on General Physical Background; Standards for Measuring Density of Accommodation; Density of Dwellings; Densities of Towns; Density and Cost of Development; Development Plans; Day-to-Day Planning Control.

The book concludes with a brief summary and appendices containing the Ministry's Schedule of Minimum Street Widths, details of permissible height indicators for testing the daylighting of residential buildings from block plans, and a list of definitions.

B.S. Handbook for Building Materials and Components

New Addendum Volume Just Published

Twenty per cent of the British Standards which are summarized in the B.S. Handbook (No. 3) for building materials and components have been substantially revised, or modified in important detail, since the book was published in January, 1950. A number of completely new standards affecting the building and allied industries has also been issued.

In order to bring the Building Handbook up to date, the B.S.I. has therefore published a separate Addendum volume running to some 165 pages.

Since the value of any reference book depends entirely upon its accuracy, the Addendum volume is strictly necessary to all users of the 1950 edition of the Building Handbook. Its full title is "Addendum No. 1, 1952, to B.S. Handbook No. 3," and it is available at 12s 6d from the Sales Branch of the British Standards Institution, 24, Victoria Street, S.W.1.

For the benefit of those who may still be using one of the earlier editions of the Handbook (which are now dangerously obsolete and should be scrapped), copies of both the 1950 edition and of the new Addendum may be obtained at the special combined price of 31s 6d (compared with the published prices of 37s 6d).

Planning Remission Appeal Result

The appeal of Mr. George Beattie, of London Road, Maidstone, against the refusal of the Maidstone Town Council to allow planning permission for a house designed for him by Mr. John Poltock, A.R.I.B.A., has been upheld by the Minister of Housing and Local Government.

The Minister, in a letter to the Town Clerk of Maidstone, says: "At the enquiry it was stated on behalf of the Council that plans for three bungalows on plots adjoining the appeal site (on the Foley Park Estate, Sittingbourne Road) had been approved. The Council had refused permission for the house proposed by the appellant because they considered it was very unusual in design and would be too much of a contrast with these bungalows. The appellant is much interested in modern architecture and has employed an architect to design him a house which appeals to his own taste in architecture. The design is undoubtedly strikingly in contrast with the designs approved for bungalows which will be built on adjoining plots, but the bungalows themselves are not designed to form a single architectural concept such as, for example, a terrace of houses, and there is no question of the proposed house breaking an otherwise carefully designed unity. In these circumstances the Minister does not consider it reasonable to withhold consent solely on grounds of unusual appearance and he has accordingly decided to allow the appeal. . . ." At the public enquiry Mr. Beattie said he had always been interested in architecture. He lived in contemporary houses when abroad and, on his return to England, had asked Mr. Poltock to design a house for him. The idea was to have a large communal living room, small bedrooms and plenty of fresh air. He wanted something better than "suburban architecture" which he considered was at a very low level in Maidstone and other parts of England. The approximate cost of the house designed by Mr. Poltock was £3,000.

Mr. Poltock is head of the department of architecture at the Medway College of Art.

CORRESPONDENCE

An Appeal

To the Editor of A. & B.N.

Sir,—This year I am privileged to be Chairman at the Annual Dinner of the London Association of Builders' Foremen and Clerks of Works, and it is my pleasing duty to launch the appeal on behalf of the Association's Pension Fund. The Association makes only one appeal each year in support of its pensioners, and I would like, through the courtesy of your columns, to call upon all my friends and associates in the industry to take a share in this excellent work in the form of a generous subscription.

During nearly 60 years the Association has carried out the task of improving the status of the builders' foremen and clerks of works with such success that to-day members are accorded recognition everywhere as an integral part of building management. It is, however, still an important part of the Association's function to provide for its more needy members in their later years.

The 56th Annual Dinner of the Association will be held on Wednesday, October 29, at the Cafe Royal, London. I am confident that, as usual, the occasion will provide an opportunity for the many friends and supporters, representing all sections of the industry, to foregather for an enjoyable evening.

Donations to the Pension Fund should be forwarded to Mr. T. Cutler, 27, Ennersdale Road, Hither Green, S.E.13, from whom tickets for the Annual Dinner may be obtained.

J. IAN ROBERTSON,
President,
National Federation of
Building Trades Employers.

Town and Country Planning

To the Editor of A. & B. N.

Sir,—I notice that the review of Brown & Sherrard: *Town and Country Planning* in your issue of September 18 does not give the information that we are agents in this country for the original publisher, Melbourne University Press. I think that those of your readers who wish to buy the book would find it easier if they knew that it can be ordered from Cambridge University Press through any bookseller.

I am, etc.,
C. F. ECCLESHARE.

"Lavatory"

To the Editor of A. & B.N.

Sir,—I was interested to read the comments on the name of lavatories both by Abner and Mr. Cecil Howitt. While I prefer the name of Jakes to any others put forward by both gentlemen, I still feel the main problem at the moment is to get these precious instruments delivered to building sites at the right time and not six months after, so that they could be used when the houses are occupied. I also feel that apart from the name the matter of design is of some importance, but as one has to wait a time to get a decently designed lavatory pan, one gradually loses interest in both name or design.

I am, etc.,
WALTER SEGAL.

To the Editor of A. & B.N.

Sir,—And I thought that Mr. Howitt was a friend of mine! It's bad enough being an architect in what the majority still seem to consider a man's profession without it apparently being our fault that a closet is not referred to as a closet.

I'm afraid we are fighting a losing battle, however—an order was recently given in this office to replace "a cracked lavatory basin." The replacement was delivered. It was the W.C. pan that was cracked. Shades of Lem Putt!

I am, etc.,
MARIAN MUNNS.

To the Editor of A. & B.N.

Sir,—I most humbly apologise to Mr. Howitt for my ladylike maltreatment of the English language! He is quite right, of course, one should not speak of nutrition when food is meant—nor of alternative accommodation when "another house" would do. I shall throw out of my office all the now so fashionable Swedish Ivy and other Aspidistras—yet I feel a profound reluctance to shock the humble workman or the delicate and refined soul of the Contractor when it comes to "Those Things" or "UNO" . . . I therefore suggest as a simple and elegant alternative for the vulgar "W.C." the word "sesquipedelian."

I am, etc.,
(MRS.) MARIANNE WALTER.

Students' Designs

To the Editor of A. & B.N.

Sir,—As a layman but nevertheless keen reader of *The Architect*, may I express concern at the fearsome exteriors of the buildings designed by students of the Liverpool School of Architecture, illustrated on pages 381 and 382 of your issue of Sept. 25.

No doubt the interiors are magnificent examples of careful and enterprising planning and design. The exteriors are horrible.

How any man with the slightest æsthetic sense could approach Berkeley Square with a building to house, above all things, an Institute of Contemporary Arts, that would not look out of place on a trading estate, is very difficult to understand. The extraordinary erection proposed for the Royal Empire Society on the Embankment can only have one justification: as something to distract the attention of the viewer from the old-established eyesore next door. The proposed Stockholm Embassy has the appearance of a seaside pavilion with a very plain warehouse attached.

All three designs are totally lacking in dignity or grace.

Why is it that the exteriors of British contemporary buildings are so utterly inferior to French or Italian work? Why are the "blitz" reconstructions so characterless? An hour spent walking through the streets of the new Rouen made one feel discouraged at our own slapdash, unco-ordinated efforts. Could not *The Architect* devote a page or pages to contrasting illustration of British and Continental designs for buildings of similar function?

I am, etc.,
ANDREW CAMPBELL.

Buildings for Farms: From the British Cast Concrete Federation

To the Editor of A. & B. N.

Sir,—We have read the article by "Dutch Uncle" in your issue of September 18 in the course of which reference is made to this organization and the C.A.C.A., and we enclose some notes reviewing our separate and joint work in connection with the above subject, also some observations on the views expressed by your correspondent, of which notes you may wish to make use in your Journal.

Review

The fact that agriculture needs good buildings which provide weather-tightness, durability, the minimum of maintenance together with finishes which facilitate easy cleaning and that precast concrete lends itself to meet most requirements has been appreciated by manufacturers for the past 40 or more years. Moreover, the B.C.C.F. and the C.A.C.A., and their forerunners, have given every assistance to facilitate the development and provision of suitable buildings, coupled with economy in cost, for the farming industry.

Exhibits have been arranged at agricultural shows and at "permanent" exhibitions and in 1942 the C.A.C.A. designed what is known as "B" unit construction which was taken up not only by members of the B.C.C.F. but by other interested precast concrete manufacturers. While at a meeting convened by the Ministry of Agriculture the representatives of the farmers and agricultural interests decided that this design was not suitable for standardization—objections being raised regarding the supporting posts and bay spacing—the units are still being made since the design is very economical for the conditions which it can fulfil.

It is interesting to note that "Dutch Uncle" considers the M.A.F. scheme (which as he says was designed to utilize reclaimed air-raid shelter steel) effective and very economical in cost. The B.C.C.F. co-operated in the design and also organizing the production of the precast r.c. components. It is hoped it is general knowledge that these buildings are still obtainable although new steel is now involved for trusses. Central arrangements are still made by the M.A.F. for I.S. authorizations and a list of manufacturers of the units can be obtained from the B.C.C.F.

In regard to milking parlours, the B.C.C.F. co-operated with the C.A.C.A. and the M.M.B. in standard designs which use the minimum amount of steel. Typical buildings have been exhibited on M.M.B. stands at Royal Agricultural

(*Continued on page* 447)

The improved restaurant. Below is a view as it existed.

REMO'S RESTAURANT, HAVERSTOCK HILL, HAMPSTEAD

Architects: J. M. AUSTIN-SMITH & PARTNER, A.A.R.I.B.A.

Assistant in charge: L. G. Dirassar, B.Arch.(Hons.) (Tor.)

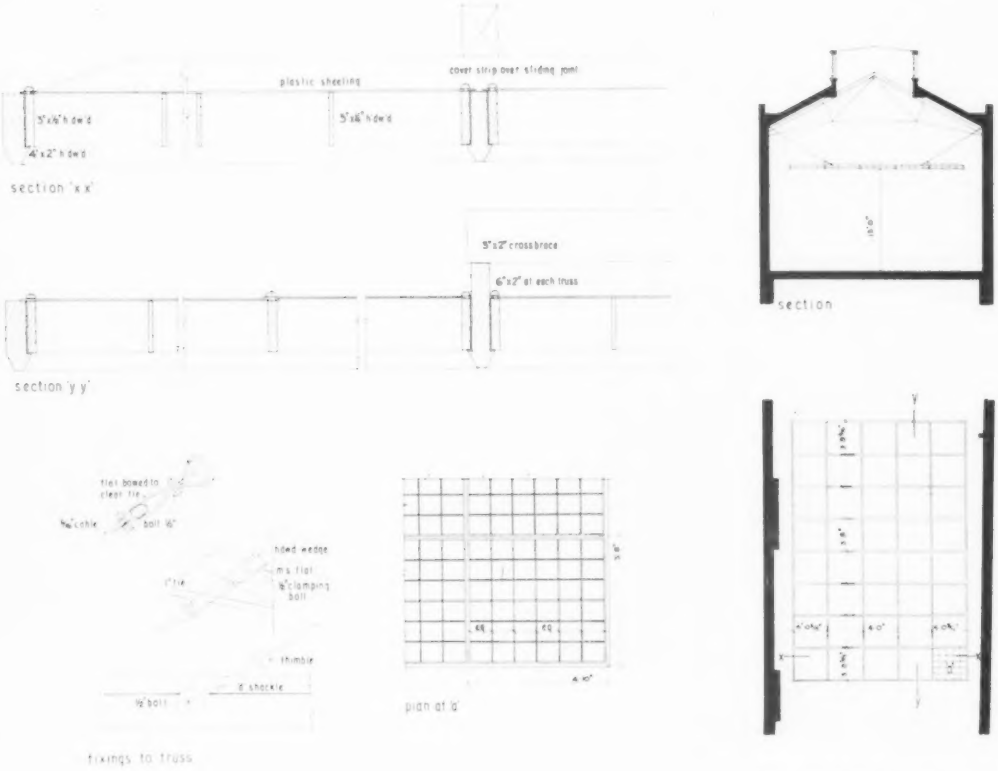
THE existing restaurant had on the ground floor one large dining room with a serving pantry at the far end behind a screen. The Kitchen was in the basement. The dining room was 16ft 6in high with exposed Cast Iron roof trusses at 11ft centres, and a wide skylight running nearly the full length. The atmosphere was one of cold bleak unfriendliness with an immense amount of light coming through the roof.

The client's requirements were :—

1. The division of the existing space to provide a sense of seclusion for private parties.

2. The whole to be sufficiently open that both areas might be supervised simultaneously.

3. To design a false ceiling which would provide a soft diffused lighting and better acoustics.



Details of the false ceiling

It was decided to erect 7ft 9in high screens—one half way across the existing room and the other to enclose a small entrance lobby; The existing screen at the far end was altered to match the new ones.

The screens have openings for circulation, and the one in the middle has an opening in which a " plant frame " supports a number of flower pots. The screens are timber framed, covered up to 3ft 8in with brightly painted hardboard and above that with Natural flax-rush matting, a pleasant buff green colour. In some cases banquette seats are fixed to the screens or alternatively two tiered graduated shelves. Both these are supported with purpose-made stove-enamelled steel legs, made of three $\frac{1}{16}$in rods coming to one point at the base. The exposed timber frame is moulded Sapele with thin white cover moulds around the rush matting.

The " plant frame " has been designed so that plants may be changed in the holders, whilst the wire tracery forms a climbing support.

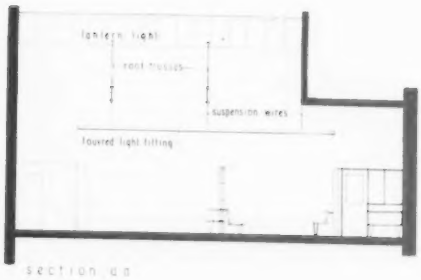
The false ceiling, 20ft × 30ft—13ft from the floor, is a timber eggcrate slung with $\frac{3}{16}$in diam. galvanized cable from the Cast Iron roof trusses and overlapping a few feet the small strip of high flat ceiling by the entrance. The latter is covered with a gay patterned wallpaper. The eggcrate is made out of small section timber 3in × $\frac{1}{4}$in and in order to prevent dust from the skylight coming into the restaurant—previously a source of considerable inconvenience—the eggcrate has been covered with translucent, uncoloured cinemoid sheeting. A similar false ceiling has been erected at a height of 7ft 9in over the entrance lobby.

The walls which will receive most wear are covered with Warerite whilst the one wall against which a long timber flower box—polished Sapele—stands is covered with the same wallpaper as the flat ceiling of the restaurant so as to provide continuity in the scheme.

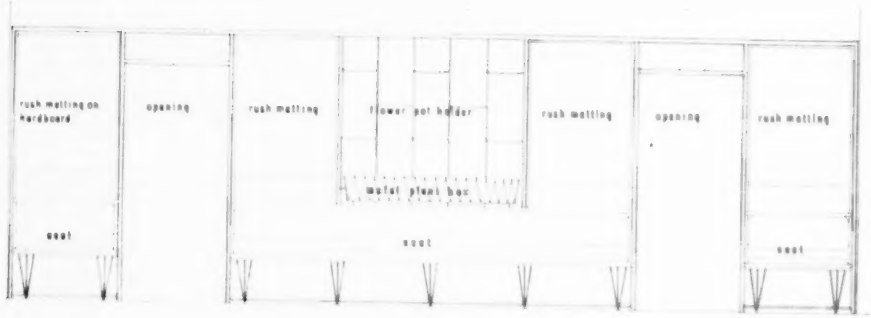
The revolving coat stands were designed in $\frac{3}{4}$in diam. metal bar and stove enamelled.

The exterior has been redecorated. Flower boxes are made of galvanized sheet metal and the framing, tracery and script is in mild steel rod.

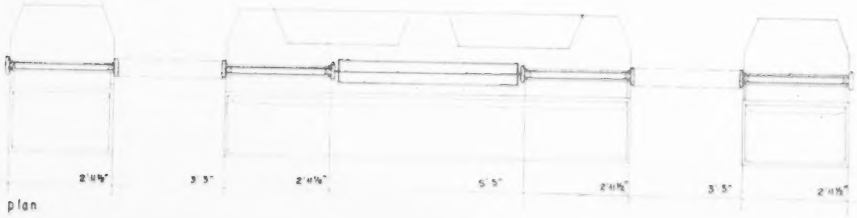
The Fascia is lettered with built up lead coated sheet steel letters to the same script as on the plant boxes.



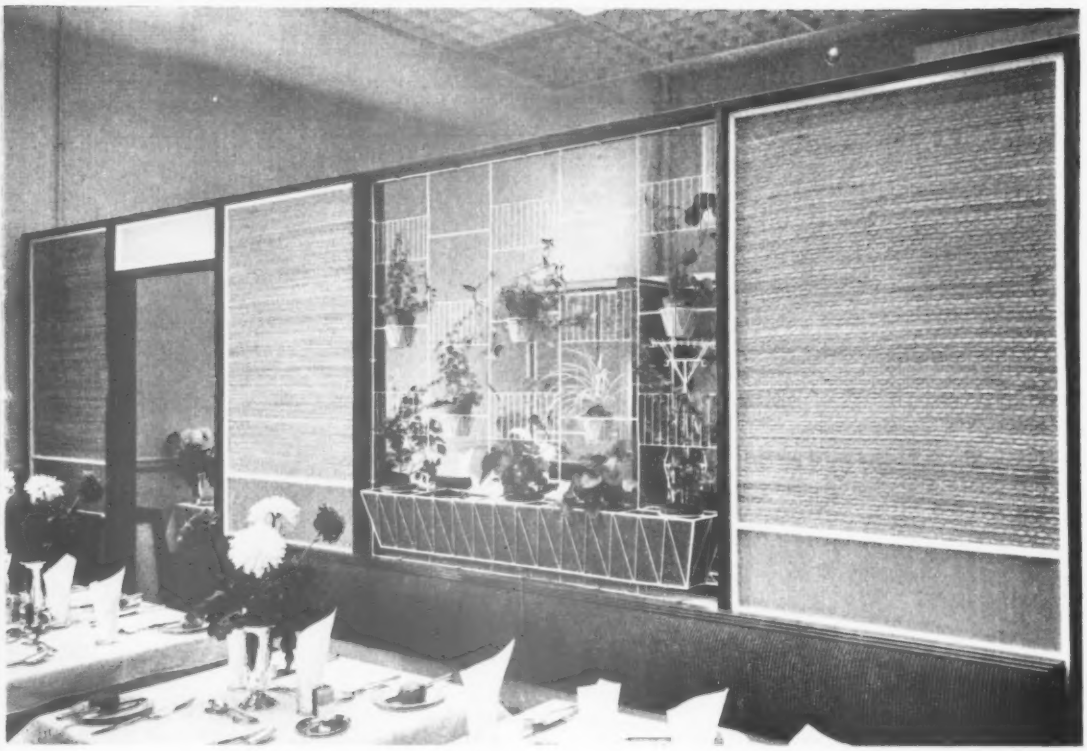
Plans of the restaurant and $\frac{1}{4}$" details of the screen.



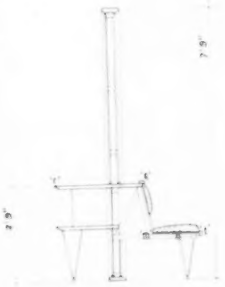
elevation

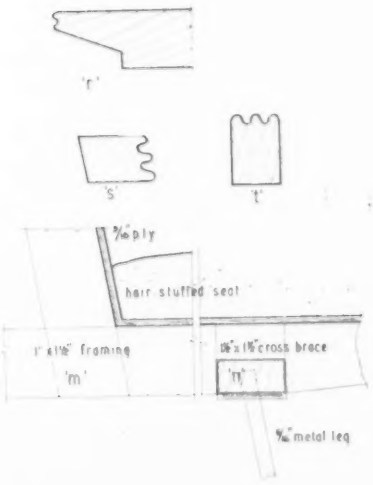


plan



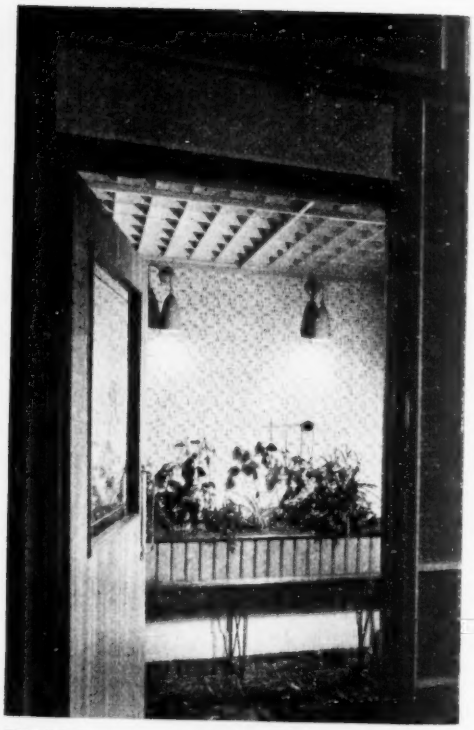
The screen divides the restaurant into two sections, one for dining and one for private parties. The natural flax-rush matting is buff green in colour ; the dado below is brightly painted hardboard.





REMO'S RESTAURANT

HAMPSTEAD



On the left is a view from the restaurant looking into the entrance lobby. The flower box shown in the picture is not shown on the plan of the restaurant. The false ceiling is a low-level egg crate over the lobby only. The original entrance is pictured below. Below, left, is a corner of the improved restaurant. The view shows clearly the texture of the rush matting covering the screen.

Architects : J. M. Austin-Smith & Partner.
General Contractors: F. G. Minter, Ltd.
Hall, Beddall & Co., Ltd.

Sub-contractors:

Cinemoid sheet : British Celanese Ltd.
Electrical Installation : Berkeley Electrical Co., Ltd.
Electric Light Fittings : Troughton & Young (Lighting) Ltd. Merchant adventurers Ltd.
Fascia lettering : Nash & Hull Ltd.
Floor : Semtex Ltd.
Glass : James Clark & Eaton Ltd.
Ironmongery : Yannedis & Co. Ltd. Bunce & Co. Ltd.
Paint : Mander Bros. Ltd.
Plant frame, Window boxes, Metal legs and Coatstands : J. J. Thomas & Co. Ltd.
Upholstery : Heals Contracts Ltd.
Wallpaper : Coles & Son (Wallpapers) Ltd.

REMO'S RESTAURANT
HAMPSTEAD.

"A Self-Build" Swimming Pool, Crowthorne, Berks

ARCHITECT : JOHN CUNNINGHAM, A.R.I.B.A., A.M.T.P.I., A.I.Struct.E.

Photograph by Peter White, A.R.P.S.

WITH its "shoe-string" resources the primary problem for this club seemed to be that of achieving a pool at all. From excavation to finish the project had to be realized within a cost of £200 by the members themselves, none of whom was versed in building, wherein lies its special interest. The design had necessarily to be as simple and economical as possible, though a concrete bath remained quite a technical operation, made no easier by having to use old reinforcement. The subsequent energy and improvisation with which the members carried it out, working at week-ends and Wednesday afternoons only, proved that a small organization could provide a bathing pool if it had the will to build it directly.

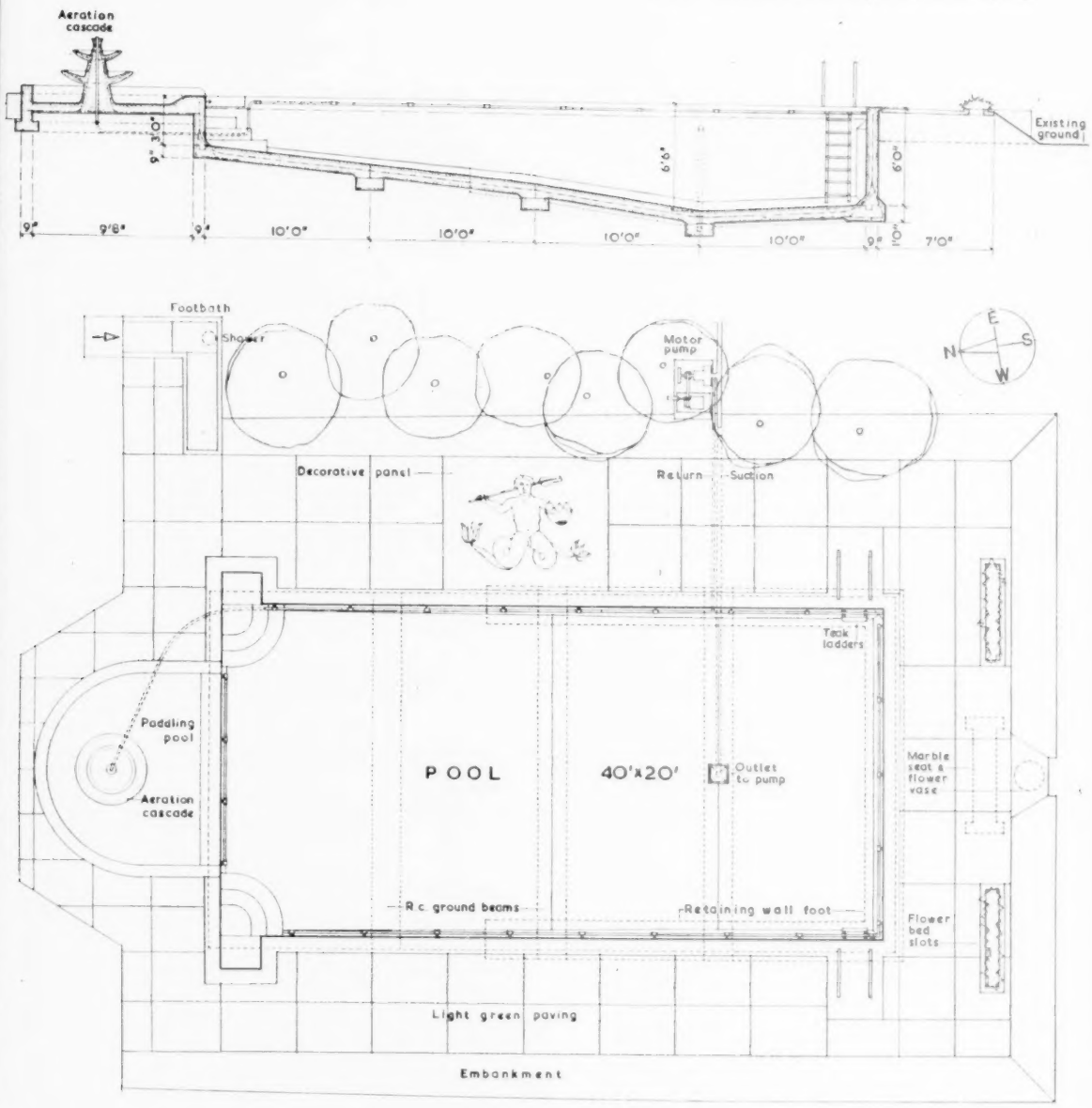
Excavation was by hand, kept to a minimum by embanking to a raised surround : the mainly sandy clay stood upright, obviating rear shuttering even in winter. Scrap kraft wrapping paper was laid under the floor before concreting. Reinforcement was with secondhand army Somerfeld track (¼in rods at 7in centres) bought very cheaply, and a donated rusting roll of light B.R.C. fabric. The club already owned a 10:7 motor mixer, saved from scrap heap consignment for £10 and given new life by a mechanically minded member.

The concrete was of 1 : 2 : 3 mix, with equal proportions of ⅜in and ¾in gravel and a minimum quantity of water. 9in thickness un-waterproofed was used with central reinforcement, owing to steel scarcity. This gave the equivalent of about 6in r.c. in opposite directions for the extreme laternate stresses of front pressure from a full pool with low site water and of back pressure should it be empty during a high site water period. Special care was taken with "day's work" joints and the junctions between floor and walls.

Wall shuttering was mainly of scrap timber, and for the deep end a quantity of large steel plates was hired. During the pouring of this end in one main operation the shuttering showed signs of moving, necessitating the hasty cutting of a fir sapling for strengthening whilst other members bodily supported the struts !

The bath is 40ft by 20ft, the maximum depth being 6ft 6in below coping or 5ft 9in depth of water, which allows plunge diving. The 2ft 3in. minimum depth is safe for children, and the shallow surround to the aeration cascade forms a paddling pool for toddlers. Access to the pool is by a sunken footbath with shower. The reinforced cascade bowls were cast separately and threaded over the pedestal reinforcement at appropriate levels.

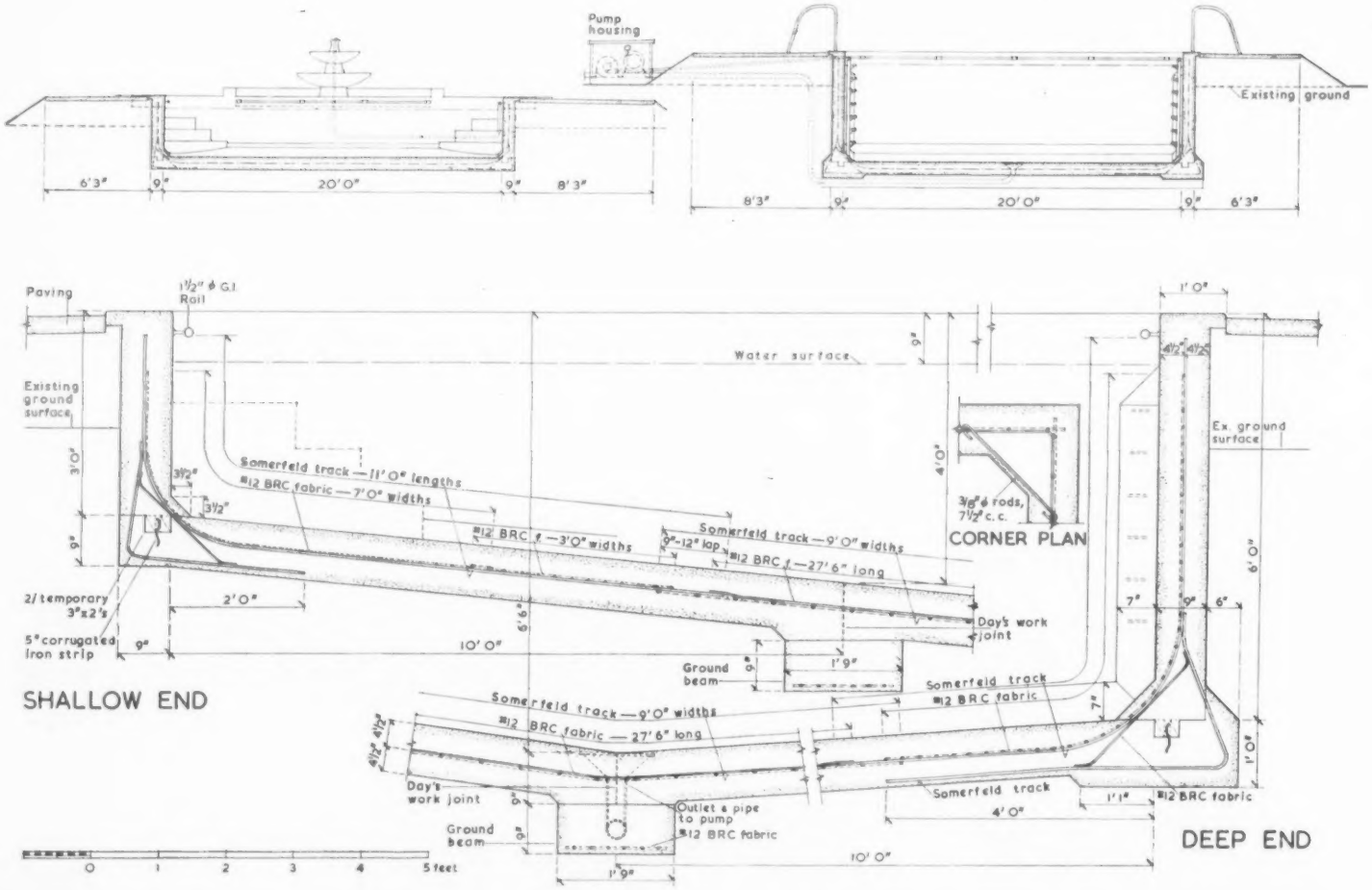
The pool was rubbed down, treated with white Snowcem and finished pale blue above water, including curb, cascade and paddling pool. The concrete surround is of non-slip cement mortar finish, divided into slabs



and coloured with light green Cementone. The design on the east side, a marine god adapted from a Roman pavement, was impressed in the unset paving from a full size cartoon and painted, with a gilt and silvered finish to the sunken outline. This inexpensive decoration to such paving is believed to be an innovation. All metal rails were treated with aluminium paint.

The small motor pump and strainer concealed in the trees is just adequate for the recirculation of the 20,000 gallons through the cascade. The complete turnover is made in 20 hours, although double this rate would have been desirable had funds allowed. The delivery from pump to cascade is through the grip rail on the east side. Initial chlorination is with two pints of sodium hypochlorate containing 15 per cent available chlorine, whilst alkalinity is maintained by spraying 5lb of "Brakol" per day's use, both supplied by Laporte Chemical Company.

The pool was completed in twelve months and is in



SWIMMING POOL AT CROWTHORNE. ARCHITECT: JOHN CUNNINGHAM, A.R.I.B.A., A.M.T.P.I., A.I.Struct.E.

attractive pinewood surroundings with exposure to the sun and adequate space for games. On the paving " per ardua ad aqua " has been inscribed, and certainly the unpaid ex Air Force " foreman " member, James Chamberlain, found the dog Latin justified. The comparatively high level of finish obtained through hard work and determination by novices under these conditions was an object lesson in this case even to the architect.

COSTS OF SWIMMING POOL

Cement	£91 0 0
Sand and gravel	£70 13 0
Reinforcement	£6 10 0
Steel shuttering hire	£5 0 0
Pump and engine (second hand), grip rail, water piping and sundries	£12 17 0
Surface finishes	£13 13 0
TOTAL	£199 13 0

BENTONS LANE HOUSING SCHEME

for Lambeth Borough Council

Architects : BOOTH & LEDEBOER

View No. 2

THE first stage of the development on this site comprising 24 houses has been completed and blocks of flats and maisonettes are now being added. Two of the completed blocks of terrace houses are illustrated in this article and the position from which the photographs were taken is shown on the block plan. As will be seen the site is an exceptionally hilly one and was chosen for development on account of the shortage of suitable land in the Borough of Lambeth. The site is close to Norwood Park.

The standards for the houses generally are those laid down in the Housing Manual and the density is governed by the recommendations contained in the County of London Plan.

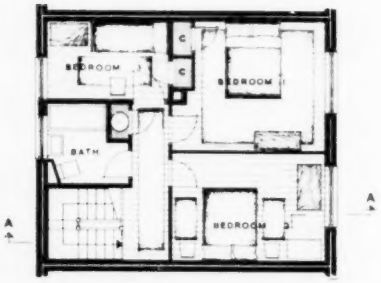
The Houses in the terrace block on the lower slope of the site, to West on the block plan, are two-storey with three-bedrooms; detailed plans are shown on page 439. The terrace houses on the upper slope of the site are planned as three-storey houses because of the steepness of the slope and these are illustrated in plan and section on page 438.

The main interest in the scheme lies in the grouping of the houses in relation to the site contours.

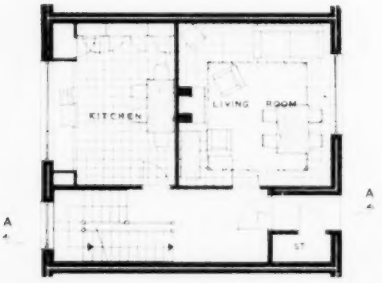
Construction is traditional. Facing bricks are Stewartby Facings and Saxon Light Flettons. A small number of dark hand-made Sussex facing bricks are used for contrast in the ground floor of the three-storey block. Similar dark facing bricks are used in panels between windows in both terrace blocks. The roofing tiles are precast interlocking Marley Ludlow tiles. Metal windows are used throughout with precast concrete or timber surrounds. Composition semastic tiles are used for the living room floor finish whilst other ground floors are finished in cement screed. The lower ground floors of the three-storey terrace houses are finished in asphalt. Upper floors are boarded on timber joists. Water heating for domestic purposes is by means of back boilers in the living room.

View No. 1

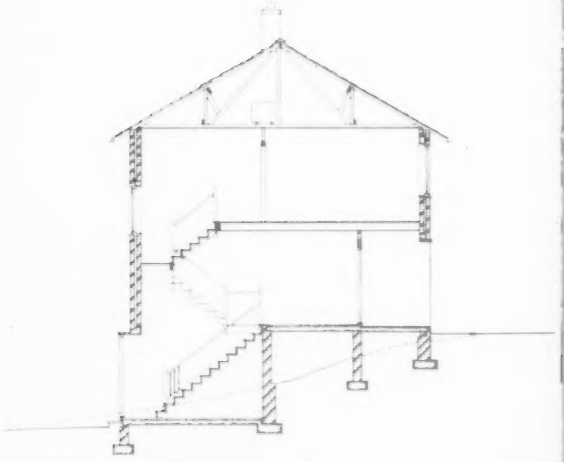
Three-storey house type plans



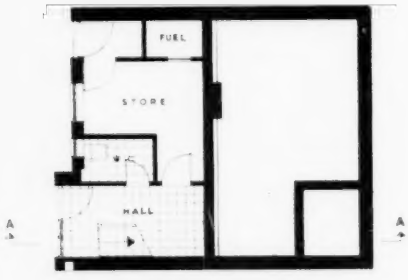
FIRST FLOOR



GROUND FLOOR



SECTION A A



LOWER GROUND FLOOR

The planning of these houses was dictated by the steep slope of the site.

Architects : Booth & Ledeboer.

Quantity Surveyors : Wakeham Trower & Partners.

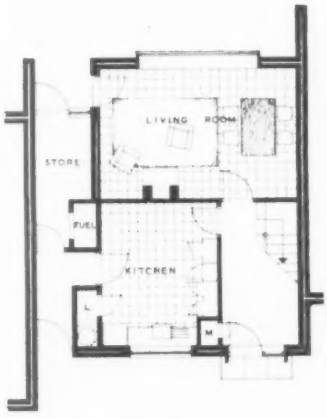
General Contractor : Walker (Tooting) Ltd.

Subcontractors

Asphalt Floor Tiles : Marley Tile Co. Ltd.
Chain Link Fencing : Durafencing Ltd.
Doors : Glikstein Doors Ltd.; H. Newsum Sons & Co. Ltd.
Electrical Installation : London Electricity Board, Grant Electrical Co. Ltd.
Facing Bricks : Sussex and Dorking United Brick Co. Ltd., London Brick Co. Ltd.
Fireplace Interiors : Rownson Drew and Clydesdale Ltd.
Gas Installation : South Eastern Gas Board.
Ironmongery : Rennie Ltd.; Comyn Ching and Co. Ltd.
Kitchen Fittings : Jennings and Meacock Ltd.
Metal Balustrades : Clark Hunt and Co. Ltd.
Metal Gates : McLaren Johnstone and Co. Ltd.
Metal Windows : MacKay Bowley and Co. Ltd.
Pitch Mastic Flooring : Burtain Asphaltes Ltd.
Plumbing and Hot Water Installation : W. H. Early Ltd.
Precast Concrete Dressings : H.B. Concrete Co. Ltd.
Precast Concrete Floors : F. Bradford and Co. Ltd.
Roof Tiling : Marley Tile Co. Ltd.
Sanitary Fittings : Rownson Drew and Clydesdale Ltd.
Slate Sills : Bingley Son and Follit Ltd.
Turfing : F. C. Courten and Co. Ltd.

FIRST FLOOR

Two-storey house type plans



GROUND FLOOR

BENTONS LANE HOUSING SCHEME

View No. 3 shown in the block plan page 437

Damp Courses

IT is a generally accepted fact that properly placed damp-proof courses are vital in all buildings, but judging by the number of references to them in publications emanating from B. R. S. and M. O. W. I have the feeling that there must be constant evidence that d.p.c.s are either of unsuitable materials or wrongly placed in the structure. Certainly when one visits buildings it is not infrequent that one sees signs of damp penetration probably arising from faulty precautions against damp.

The materials suitable for damp-proofing of buildings are fairly numerous, but several of them are only suitable in certain positions. B.S. 743, which was revised and extended about a year ago, sets out quality requirements for a very full range of materials, but I notice, however, that the type of bitumen coating sometimes used on brickwork and in sandwich types of surface concrete is apparently not included. In addition to setting out the quality for each material B.S. 743 has a long appendix giving notes on the selection and laying and also notes on individual types of d.p.c. As far as they go these notes provide very sound guidance, but, since the subject is so important, I believe there is justification for the preparation of a code of practice, but I have seen no indication that one is projected. Much information on the subject of d.p.c.s is spread about the various codes dealing with the carcase of buildings, but I find it difficult to put my finger quickly on the code which has the answer to a particular problem.

It is certainly not clear in the notes to B.S. 743 when or under what conditions each of the six bitumen damp-proofing materials should be used, nor is, as far as I can trace, clear guidance given in the codes of practice such as that for brickwork (C.P. 121.101), where descriptions, such as "flexible damp-proof course," are used without qualifications. There is a considerable difference between a bitumen d.p.c. with hessian base and one with an asbestos base, and it would therefore seem that each should have its special applications.

When the protection of basements is involved and there is a risk of water pressure there is only one possible material, namely, Mastic Asphalt. Mastic Asphalt covers two distinct types of product, first, Mastic Asphalt is the naturally impregnated rock as the aggregate and, secondly, that made with normal limestone as the aggregate. Both types have been widely used and I doubt there is much difference in their damp-proofing capabilities, although I have a sneaking feeling in favour of the use of natural rock for tanking applications. Both types are covered by British Standards, the natural rock type by B.S. 1418 and the limestone type by B.S.1097. As one Mastic Asphalt looks just like another to me either when it is in block form or in the mixer I decided long ago to specify by reference to these B.S.s as my only safeguard to being provided with a tanking grade instead of a roofing or flooring grade. Moreover, I find I can now have blocks which bear a B.S. Certification mark for indentification purposes.

Unlike Mastic Asphalt for roofing or flooring, there is no code of practice to act as guidance when using Mastic Asphalt for d.p.c.s and tanking, but both B.S. referred to above have some useful notes on application as an appendix. These appendices have some diagrams which stress the more essential precautions to be taken to ensure watertightness. I still think a more detailed code would be better than the notes in these two B.S.

The really vulnerable positions to damp penetration in buildings, which often receive insufficient attention, are the junctions of horizontal protection in surface concrete and floors with those in walls, protection around window and door openings and last, in parapet walls and chimney stacks to prevent downward penetration. Precautions in chimney stacks were mentioned recently in these notes, and reference made to CP.131.101 for flues, in which positions metal d.p.c.s are almost essential.

The most difficult positions to treat adequately are those around windows and door openings. It has become usual in these positions to use bitumen-felt, as the d.p.c. material is the easiest to handle and the least costly. At moments, however, I have slight doubt as to the durability of bitumen-felts when used over the heads of openings in cavity walls, as there are occasions when the material has little support, and should the felt, or other base fail, there is nothing to keep the bitumen in place. In normal horizontal d.p.c.s in walls, I doubt it matters at all if the base material disappears in time, as the bitumen should remain and provide the necessary protection. Over the heads of windows I would still prefer to use metal, i.e., lead or copper, if I was not restricted in my use of these metals mainly on account of their price.

I have noticed rather often that d.p.c.s over the heads of openings, reach the face of the wall above the arch, or its equivalent, thus leaving a very vulnerable part of the wall unprotected. The diagrams dealing with this matter in CP.121.101 "Brickwork," show very clearly the right way to insert these d.p.c.s. The length of these d.p.c.s over openings is vitally important; they should be at least 9in longer than the lintel they protect, so that any moisture which collects and runs to the side, drops clear of the sides of the closure of the cavity.

There seems often to be a desire by architects to avoid showing d.p.c.s wall faces in parapet walls, and over openings, but I am quite sure that they should actually project beyond the wall face to be effective, so that moisture on them can drip off, and not trickle down and defeat the purpose of the d.p.c. I have seen many examples of d.p.c.s in walls being covered by rendering, with the result that moisture in the wall above the d.p.c. finds its way to the wall below, behind the rendering. Incidentally the most important damp precaution for parapet walls, is to have an adequate coping, properly weathered on top, and with good projections beyond each wall face, and a d.p.c. under the coping; the projection also needs to be adequately throated.

There have been far too many copings applied without sufficient projection beyond the wall faces. Copings must be of suitable materials, and I prefer stone, either natural or cast, but the selection of types of stone needs to be given very careful consideration to ensure adequate density. Rendering over the tops of parapet, is, in my experience, absolutely useless. I have found slates or tiles of small value unless there is a proper d.p.c. below them. Finishing parapets, as is so common, with bricks on edge, bedded on two courses of slates or tiles, usually leads to trouble sooner or later, and very soon if there is no d.p.c. under them. The correct methods of designing parapet walls, to ensure adequate protection of the walls themselves, and under structure, are very clearly illustrated in the code on brickwork, and in several B.R.S. bulletins and other publications, so there should be little reason for future failures on this account, as proper information is so readily available.

DUTCH UNCLE

M.O.W. LECTURES

OCTOBER

DUNDEE, October 21, at 7.15 p.m.
SITE INVESTIGATION.—Speaker: N. W. B. Clarke, Building Research Station, at the Lecture Hall, Technical College, Bell Street, Dundee.

MIDDLESBROUGH, October 22, at 7 p.m.
OPPORTUNITIES AND PROSPECTS FOR BUILDING APPRENTICES.—Speaker: J. C. Cox, Secretary, Building Apprenticeship and Training Council, at the Kirby Girls' Secondary Grammar School, Roman Road, Middlesbrough.

ABERDEEN, October 22, at 7.15 p.m.
SITE INVESTIGATION.—Speaker: N. W. B. Clarke, Building Research Station, at the Robert Gordon's Technical College, Aberdeen.

NOTTINGHAM, October 22, at 7.15 p.m.
FOUNDATION PROBLEMS.—Speaker: L. R. Creasy, Superintending Structural Engineer, Ministry of Works, at the Police Assembly Room, Shakespeare Street, Nottingham.

TWICKENHAM, October 27, at 8 p.m.
DAMPNESS IN BUILDINGS.—Speaker: A. G. Day, Building Research Station, at the Twickenham Technical College, Egerton Road, Twickenham.

DIGEST OF SOME OF THE PAPERS READ AT THE THIRD INTERNATIONAL SYMPOSIUM ON THE CHEMISTRY OF CEMENT

MUCH information of interest and practical value to architects and builders was revealed in the papers presented to the Third International Symposium on the Chemistry of Cement, held at the Royal Institution, London, from September 15 to 20, 1952. It was encouraging to hear from Sir Ben Lockspeiser, Secretary of the Department of Scientific and Industrial Research, that there is no competition between the research done in Government Laboratories and that undertaken by industry.

He pointed out that cement and concrete are major constructional materials which have revolutionized the technique of civil engineering and have radically affected practically every branch of the building industry. World output of cement is about 120 million tons per annum, the equivalent of about 500 million cubic yards, enough to girdle the equator with a road 150 feet wide and 8 inches thick.

In Great Britain in 1951 about 10 million tons of cement were produced, of which about 2 million tons were exported, the value of the products made having been estimated to be about £180,000,000. On the basis of this immense sum, it is clear that a large research effort is warranted, this sum being more than one-third of the value of British steel production.

In the D.S.I.R., research on cement and concrete forms a very important section of the work of both the Building Research Station and the Road Research Laboratory; the research laboratory of the Cement and Concrete Association at Wexham Springs is supported entirely by the cement manufacturers, being devoted to work on the use of concrete in many different fields. This represents one of the most important contributions of private industry towards the solution of many important problems in this field Although engineering research on concrete is to be found in many of our universities, with one notable exception there is no corresponding research on the physics and chemistry of cements, and every effort should be made to improve this position.

This lack of balance in our research effort should be remedied without delay, and as time goes on we are reminded with ever-increasing emphasis that fundamental research on any subject cannot be neglected. Such fundamental enquiry provides the foundation upon which we must base the solution of any future problems, and it also stimulates a vigorous intellectual climate promoting new discovery and the rapid growth of new ideas. It is essential to bear in mind that advances in science are often unexpected—indeed, the amazing progress of nuclear physics is an outstanding example of this—and therefore we should make due allowance for scientific adventure. It is significant that the total expenditure on research into problems affecting cement and concrete in Great Britain is one-fifth of one per cent of the total value of the products made from cement, so that there is ample room for expansion.

A most interesting paper on the early history of cement by P. Gooding and P. E. Halstead, teaches us that British pioneers have achieved great things in this development. Joseph Aspdin invented Portland cement and took out a patent for it on October 21, 1824, and a century later a tablet was unveiled to his memory by the Portland Cement Association of America in collaboration with the Cement Makers Federation of Great Britain. The original patent—No. 5022 of 1824, is now owned by J. W. Aspdin of Harrogate, a great-grandson of the inventor; this was exhibited in the Minerals of the Island Pavilion at the South Bank Exhibition of the Festival of Britain last year.

Smeaton, the famous civil engineer, in his book on the Eddystone lighthouse published in 1796, had stated after a series of experiments that "I did not doubt but to make a cement that would equal the best merchantable Portland stone in solidity and durability." A failure was experienced during construction of a portion of the Victoria Docks from 1850 to 1855, and repairs were partially effected with Portland cement concrete.

It is believed that the first work of large size on which Portland cement was used was the London Main Drainage Scheme, designed in 1859 by John Grant. Testing was carried out on site by machines made by C. Adie, being operated without difficulty by comparatively unskilled labour; 70,000 tons of Portland cement were used in six years and 15,000 tests were made, from which it was confidently asserted at the time that no cement of an inferior or dangerous character was used on the works.

Research on cement is a branch of silicate chemistry, silicates having wide industrial importance; their structure is extremely complex, and therefore they have been examined both by crystallography and X-ray structural analysis. It it always interesting to trace unforeseeable connection between one branch of science and another. For example, Tobermorite is a very rare natural mineral first described in 1880 by Professor Heddle, who recognized it as an hydrated calcium silicate. Its true nature remained unsolved until 1952, when the first detailed X-ray data on the principal silicate constituent of hydrated cement were published. At the same time the collection at the British Museum was being rearranged and an X-ray powder diagram of Tobermorite was taken; this was identical with that obtained from calcium silicate hydrate. Thus, Heddle's rare mineral is synthesized daily throughout the world, to such an extent that millions of tons of it are produced every year in Great Britain alone.

This Symposium has indicated the degree and variety of research which has been carried out on cement in many countries. This has been of equal importance to both producer and user, their share in the common effort being reflected in the names of the various authors who have contributed papers. There is no doubt that many new aspects of this subject will come to light as a result of the discussions thereby stimulated, and the building industry will benefit accordingly.

Mr. A. R. Collin's Paper

One of the most interesting papers from the building and architectural aspects was that presented by A. R. Collins on the design and construction of concrete structures. The most important development in concrete manufacture in Great Britain in recent years has been the rapid increase in the use of methods of mix design based on scientific data and a wider application of the control of quality. Such techniques have been used on large works for many years, but since 1945 they have also been applied to smaller works. This growth in applied science has been in response to an increasing demand for concrete of high strength and durability, and has been greatly facilitated by developments in manufacture of small weighbatchers of low cost suitable for portable mixers. During the last five years, the manufacture of these weighbatchers has increased from ten to fifteen times the pre-war output.

The method of mix design now commonly used in Great Britain is based on that developed at the Building Research Station and the Road Research Laboratory and fully described in publications of the D.S.I.R. This rests on the assumption that quality of concrete can be measured in general by the crushing strength of test cubes, which is true enough for practical purposes; that strength depends within certain limits on the water/cement ratio alone, and that with a given water/cement ratio the mix proportions can be varied to obtain any desired degree of flow without greatly affecting the strength. Other contributing factors in this new outlook have been the rising standards of training and design and the demands of designers for higher working stresses than formerly. To-day most civil engineering contractors have central testing laboratories which control the technical aspects of concrete production in the field and sometimes undertake research. These organizations are doing excellent work, providing contractors with the information necessary for them to be able to advise on the materials used for concrete making and on mix design.

Collins emphasizes the practical value of high standards in concrete quality. Before the last war, minimum specified cube crushing strength of high grade concrete of about 1:6 proportions was often no greater than 3,000 lb per sq in at 28 days. At the end of the war a minimum strength of 4,000 lb per sq in was set for airfield runways and there was some doubt if this could be consistently met with in mixes leaner than 1:6, but the specification was in fact satisfied with a mix of 1:6.25 by weight (530lb per cu yd) which gave an average strength of about 5,750lb per sq in at 28 days. In 1952 runway construction similar strengths are being attained with mixes of 1:7.25 proportions (475 per cu yd).

Although the centenary of the invention of reinforced concrete has already been celebrated, Collins rightly points out that it is only recently that the possibilities of this remarkable material have been exploited. Between the two world wars, new structures and new methods of using reinforced concrete were developed, in which the inherent properties of the material were more fully used than before, but perhaps prestressing is the only development which can be called revolutionary. Recent developments are often no more than variations in size, scale or shape but variations of such a kind that the resulting structures have completely changed in appearance

Barrel vault roof on Drill Shed at the Royal Marine Depot, Deal. Architects: Julian Leathart, Son & Tingay. Engineers: Barrel Vault Roofs (Designs) Ltd.

Tooled concrete columns at the Cement & Concrete Association's Research Station, Bucks. Architects: Design by the late Christopher Nicholson, completed by Sir Hugh Casson & Neville Conder.

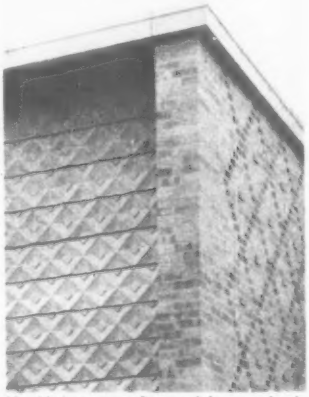
and new methods of design have had to be evolved. One of the most important of the new structural forms is the thin shell used for barrel vaulting, domes and similar roofing shapes.

Vaults and domes of brick or masonry have been used for centuries, some of outstanding size, but always exerting a thrust on the supports which demanded heavy buttresses to provide necessary strength. In the modern concrete dome there need be no external thrust, and the structure may be supported on thin columns or walls. Shell concrete construction is claimed to have originated with the domes needed by Zeiss for his planetaria and for a long time the methods of design and construction were most highly developed in Germany. Shell construction gives a clean interior and exciting possibilities of architectural adventure, so that to-day there are probably thousands of such structures in existence all over the world. In this country alone some 500 have been built since the last war.

A shell roof may be of simple cylindrical shape with edge beams, or may consist of multiple cylinders joined edge to edge and circular or square domes. Multiple shells may be tilted to give north-light roofing, or two or more shells may be combined. The membrane may not even be curved but may consist of flat sections set at various angles. Shell roofs may be supported along their edges or at their corners, or may be cantilevered from single supports. Clear spans of from 100 to 150 feet are comparatively common and even greater spans have been built although they are economically less justified.

The lamella roof is similar in outside appearance to the shell roof, and has been very successfully used by Nervi in Italy. This is constructed of small precast concrete elements set in a diagonal pattern and supported at a few points by sloping buttresses.

The anticlastic shell is a type not yet widely used, but having certain advantages, in which the roof membrane is curved in two directions at right-angles to each other, with the centre of curvature on opposite sides of the membrane. The resulting shape somewhat resembles the effect obtained by twisting opposite edges of a flat slab. It has the advantage that all lines parallel to the edges are straight so that the main supports of the shuttering may be made straight. A proposed design for Coventry Cathedral incorporates an

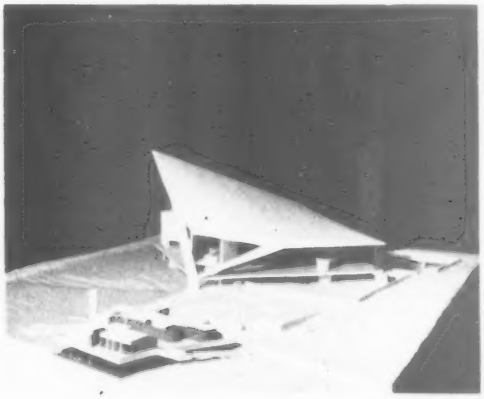


Moulded concrete facing slabs on school at Ipswich. Architects: Johns & Slater.

Prestressed concrete bridge over the Marne at Esbly. Engineers: Société Technique pour L'Utilisation de la Précontrainte

Precast concrete kiln house and store for a Pottery Factory. Architect: L. Erdi. Engineers: W. S. Atkins & Partners.

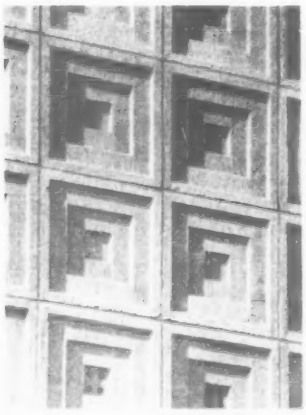
Precast prestressed secondary beams in new hangars for B.E.A. at London Airport. Architects: Ramsey, Murray & White. Consulting Engineers: Scott & Wilson.



Model of an "anticlastic" shell roof submitted for a design for the new Coventry Cathedral. Architects: Alison & Peter Smithson. Consultants: Ove Arup & Partners.

Cantilever shell roof at Madrid Race Course. Designer: E. Torroja.

Some of the illustrations to Mr. A. R. Collin's paper are reproduced on these pages



Precast moulded and tooled facing slabs each 2 feet square. Institute of Zoology, Nancy, France.

anticlastic shell roof of 200 feet square. (*Photo.*)

Development of prestressed concrete has proceeded almost at the same pace as that of shell construction. Its origins go back to the early years of this century, when unsuccessful attempts were made to apply pre-tension in the steel of reinforced concrete, but the pioneering work of Freyssinet from about 1925 to 1940 has made prestressing a practical structural process. The importance of his contribution to this technique lies in the fact that he realized the difference between reinforced and prestressed concrete. Earlier workers had merely tried to increase the stress in the steel, whereas Freyssinet thought of the stress as being applied to the concrete and of the steel merely as a convenient but not the only way of doing this. He also appreciated the importance of creep and shrinkage, realizing that prestressed concrete could be successful only if both concrete and steel were of very high strength.

The now famous bridges over the Marne in France are some of the most outstanding achievements of Freyssinet, in which the main members were precast in sections in a factory nearby, assembled and prestressed together and then floated into position. Use of standardized sections was a notable development in bridge construction. In Great Britain the output of prestressed concrete is already about 10 or 15 per cent of that of reinforced concrete and prestressing steel is being used at the rate of about 12,000 tons per annum. Several notable large structures have been erected as well as a number of excellent small ones.

The new hangars at London Airport represent one of the most efficient uses of concrete in spanning large distances that has so far been obtained; the roof beams having a span of 110 feet with a T-section 4 feet wide and 6 feet deep and only 4 inches thick. They were made in sections at a products works, being subsequently assembled and prestressed on the site before being lifted into place. At the other end of the structural scale are small bridges in the New Forest, Hampshire, which have achieved structural and architectural elegance with simplicity and ease of erection; they were assembled on site by only three men. Collins points out that although prestressed concrete is now an established structural system, its apparent simplicity and everyday use should not obscure the fact that its resources are

by no means exhausted. When used in combination with precast and other structural forms such as shell construction it shows promise of spectacular results in the future.

During the last fifteen years there have been many remarkable developments in construction technique, most of which have now become standard practice in building and civil engineering. Collins has selected as examples air-entrainment, precasting of structural concrete, and the use of special surface treatments to give concrete structures of satisfactory appearance. Many other interesting and promising developments, such as lightweight concrete both plain and reinforced, vacuum concrete, high-temperature curing and vibration, have had to be omitted.

Air-entrainment is very widely used in the United States, but it has not been so extensively employed in Europe in spite of its obvious advantages in improving the frost resistance of concrete. This difference in use may be partly due to differences in climate, but it may also be due to the use in Europe of concrete of lower workability than is customary in the United States. This concrete not only has an inherently higher frost resistance, but its low workability makes it more difficult to entrain the optimum proportion of air. Research by Powers has shown that the air acts rather like a safety valve in relieving the pressures generated in the concrete by the freezing water. Collins believes that air-entrainment is a valuable new addition to the resources of the engineer using concrete.

Precast Concrete

Precasting of structural members has the advantages of speeding up and simplifying construction which have overcome most of its disadvantages. The most important reasons why this technique has made such progress in recent years are the shortage of materials for shuttering, complex shape of many structural members, and general reduction in weight of concrete structures resulting from the use of high stresses and the employment of efficient cranes and other lifting appliances. By using precast concrete, work can begin on many parts of the structure simultaneously and one mould can be used instead of many that would be required for normal concrete cast on site, without any reduction in speed of construction. Elaborate shuttering does not become uneconomic when the requirements of the structural design demand it, so that the designer has greater freedom than before.

Precast concrete was employed on a very wide scale in the last war for standardized buildings in army camps. These were generally single-storey huts comprising a series of portal frames covered with light sheeting. Since the war many buildings of a similar type, but often much larger, have been erected in Great Britain for use as factories, but precasting has also been employed in multi-storey frame buildings of many kinds. Notable examples are hangars in France erected by a British company; office buildings in London; and the power station at Acton, in London, where columns and beams with weights up to 30 tons each were precast. The shell roof of the hangar at Marignane has a span of 300 feet which was cast on the ground and lifted into place by means of jacks, and which is an excellent example of a specialized form of precasting. The lamella roof is another. The American "tilt-up" method of construction and the process in which floors are cast at ground level and then raised by jacking them up the columns, also developed in the United States, are other sound structural techniques. Prestressing enables structural continuity to be easily obtained with separate units, so that precasting has become almost the accepted construction method, thereby permitting complex structures to be erected with ease and economy.

Collins maintains that if concrete is suitably treated its appearance can be satisfactory from the æsthetic standpoint, and it can be used to give a whole range of colours and textures unobtainable with other building materials. Many different treatments can be used with success, but those generally employed are variations of three processes, namely: exposing the aggregate, tooling the surface, and casting the concrete in shaped moulds to produce fine or coarse textured or boldly patterned surfaces.

With these treatments many difficulties are overcome, but some problems still remain, and with *in situ* concrete the treatment often has to be carried out after the concrete has been hardened, with resulting high costs. Difficulties arise from variation in colour of the aggregates and cement paste, and efflorescence may also affect the surface. These may be largely overcome by using precast surfacing slabs, but not all structures are suitable for this kind of finish. Sometimes the use of textured renderings provides a solution, but efflorescence may again cause uneven changes in colour and apparent fading.

Every new development creates new problems, and every problem solved exposes other problems, problems in one field often having to await solution of others in other fields. The new structural uses of concrete outlined in this valuable paper have brought with them new problems in design and construction, which are bound to have an important influence on the technique of making concrete. In some respects structural developments are in advance of the materials of construction, and they thus provide a challenge to the cement and concrete technologists who set out to solve the problems that they pose. They also provide a challenge to the structural designer to devise methods of design that can be used in the ordinary engineering office. The effect of these developments on cement technology is difficult to foresee, and it is not likely to be immediate.

Cement in general is usually of an average quality much greater than provided for by standard specifications. The chief reason for this margin of quality is that the tests for quality of cement are not yet so reliable that the same result can be obtained from the same sample when tested at different times by different laboratories. In addition, the failure of a batch of cement to comply with the specification is a serious matter not only because of the heavy expense involved, but also because sub-standard cement is so rare that engineers do not as a rule await the result of tests before using the cement.

In Great Britain the standard test is made on a 1:3 mortar cube compacted by vibration on a small standardized vibrating table, and with this test it is possible to obtain consistent results at any one laboratory. For example, six cubes made individually from one sample of cement may have compressive strengths with a coefficient of variation as low as 2 per cent and coefficients much more than 4 per cent are rare. There is, however, greater variation in the results of tests made at different laboratories, the causes of which are by no means clear. It is known that among the more important of these causes are the effects of temperature and differences in the behaviour of compression testing machines.

It has been said that if concrete with a guaranteed crushing strength of 11,000 lb per sq in could be obtained, prestressed concrete would be, weight for weight, equal in strength to structural steel. Strengths of this order are already obtained in the laboratory from economically possible mixes, but the problem of compacting the concrete in the field has not yet been overcome.

In passing, it may be of interest to refer briefly to information recently supplied to the author about a stressed concrete foundation for a steam hammer constructed to the designs of J. H. A. Crockett, B.Sc.(Eng.), A.M.I.C.E., which incorporates the Freyssinet system of prestressing and a special grouted concrete of very high strength known as Prepakt concrete. This 8-ton forging hammer is owned by the International Nickel Company of America, Huntington, West Virginia, and is the first to be fully analysed for shock, vibrations, movements and loads in all directions. It is also the first foundation to be built with stressed concrete, the difficulty of placing the concrete in very closely spaced reinforcement being overcome by a special grouting technique.

After considerable research, a grout mixture was obtained having the proportions of 9:1:6, representing 9 parts of cement; 1 of Alfesil, a very fine fly ash derived from electrostatic precipitation in the boiler flues of large power stations; and six parts of sand. Normal Portland cement was added to keep down heat, and an air-entraining agent was also added to stimulate the flow of grout. Another additive had the effect of postponing the setting of the cement until 15 hours had elapsed.

Compression tests of 6-inch by 12-inch cylinders on site have given breaking strengths of 4,010 lb per sq in at six days, 7,020 lb per sq in at 60 days, and 10,600 lb per sq in at 180 days; further tests will be carried out at the end of a year. The considerable increases in breaking strength from 28 days to the later periods have been produced by the pozzolanic qualities of the fly ash known as Alfesil. The equivalent 6-inch test cube breaking strength at 180 days is the very high result of 13,000 lb per sq in and it is possible that at the end of a year a breaking strength of 15,000 lb per sq in may be obtained.

This very high-quality concrete was used for the construction of the upper and lower inertia blocks below the anvil, both being mounted on a special system of rubber springs and vibration dampers, as well as steel helical springs. There are four sets of Freyssinet stressing cables in each block, by means of which stress is maintained in the concrete in three directions simultaneously, the first time that such a technique has been employed. Failure by fatigue will occur in concrete when the water/cement ratio is high rather than low, and this condition applies particularly when stress is oscillated from tension to compression and back again, but this will not be so marked if the stress is kept entirely compressive, so that changes are either a little more or a little less compression. This result can be attained only with modern stressed concrete. In this particular case, even under fully controlled conditions, live load from the anvil is about five times the dead load, so that the problem is very pronounced.

(*Continued on page* 445)

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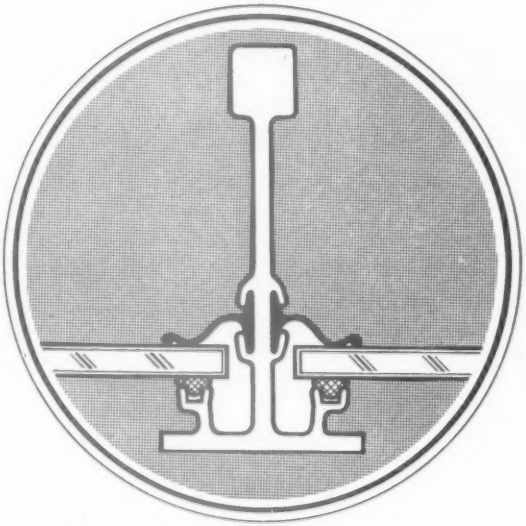

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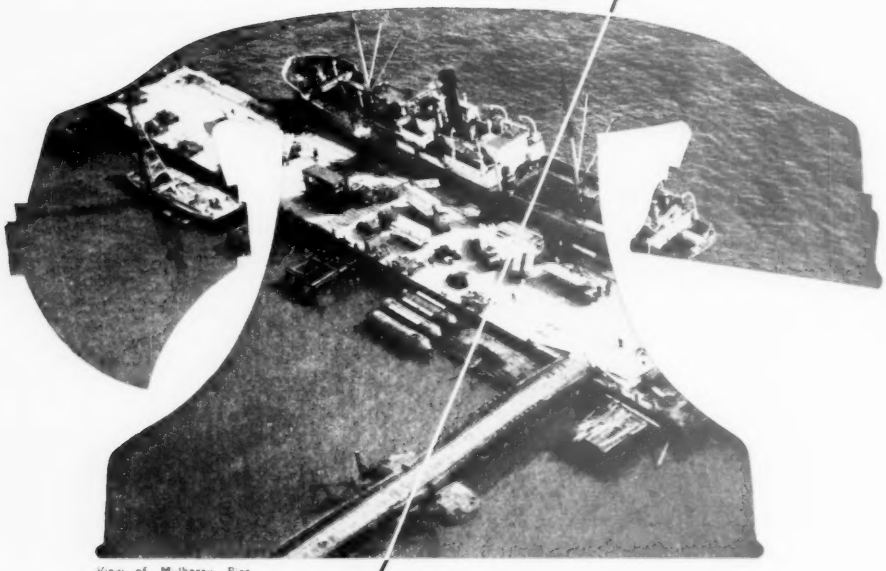

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The author has mentioned this installation in some detail because this foundation probably incorporates the most perfect concrete yet made, and the installation bears out in practice the contention by Collins that the potential applications of stressed concrete are very considerable. This hammer has been working satisfactorily since October, 1951, with stoppages for only comparatively minor repairs and adjustments, for 24 hours a day six days a week on very heavy and important work. It demonstrates effectively what can be obtained with modern grouted concrete of high strength and also shows the value of practical scientific research on site in the development of new mixes to attain results which can only be described as sensational.

Whereas many of the papers presented to the Symposium are highly technical and therefore of mainly specialized interest, it will be useful to refer to some of the practical points which were brought out and which are of value to architects and builders. George L. Kalousek states that at ordinary temperatures the reactions of hydration of cement in concrete are those of the cement paste alone unless a pozzolanic or reactive aggregate is present. Under hydrothermal conditions, the reactions are more complicated because the cement reacts with siliceous materials present as aggregate dust, or with those deliberately added. The resulting reaction products, depending on the impurities in the aggregates, may have compositions widely different from those of normally hydrated cement. It is known that many properties of concrete products are enhanced by high-pressure steam curing and this is generally attributed to the formation of crystalline solids.

A highly scientific and very practical paper was presented by H. Gygi on the heat balance of a cement kiln. This is particularly important in the Author's native land, Switzerland, which has abundant raw materials for cement manufacture, but which lacks coal, so that this essential material has to be imported, the need for fuel economy is therefore obvious in the Swiss cement industry. By studying the actual working of a cement kiln using the methods employed by this Author, it is possible that substantial fuel economy could be achieved in our own cement industry, with consequent national benefit.

Professor Bernal's Paper

Another very interesting paper was that presented by Professor J. D. Bernal on the structures of cement hydration compounds. He shows that the chemical composition and physical state of the compounds produced in the hydration of Portland cement have been an object of study for many years, yet the complexities of this problem still largely baffle investigation. We still know little or nothing of the essential structure and physico-chemical relations that determine the basic events in the setting and hardening of cements. As a result practice in this field is dependent on a purely empirical variation of conditions and recording of results.

Professor Bernal is one of our most eminent X-ray crystallographers, his work at Birkbeck College in the Physics Department having been carried out in collaboration with the Building Research Station; this paper records some of the more academic work on cement hydration for the most part undertaken by Taylor and Heller. Yet this research is being done not only with the hope of solving scientific problems, but also with the objective of understanding more fully the practical problems of cement hydration, setting, hardening and shrinking.

Work so far undertaken is of a pioneering nature. It has shown that the problems of the calcium silicate hydrates, although difficult, can be successfully attacked by modern crystallographic methods. Further steps are also apparent, and they lead in two directions. One is a fundamental and complete structural analysis of the silicate hydrates and establishment of their stability ranges. The other is an extension to the more complicated system represented in the setting of Portland cement of various compositions and under different conditions. Only when these have been well explored will it be possible to find a truly scientific explanation of the phenomena and thus to gain real control of the industrially important processes of the setting, hardening, creep and shrinkage of concrete. If Professor Bernal can achieve this he will have made a striking contribution to our knowledge on concrete, of particular value where stressed concrete is concerned, and of considerable commercial value.

In the paper dealing with studies on the constitution of Portland cement clinker, R. H. Brogue states that at the time of the first Symposium on cements sponsored by the Faraday Society in 1918, Portland cement clinker was considered chiefly from the point of view of oxide composition and the ratios of certain oxides. The main tool of research had been the microscope, and the studies of Le Chatelier and Törnebom had defined some of the major phases of clinker.

By the time of the second Symposium, sponsored in 1938 by the Royal Swedish Engineering Institution for Engineering Research and the Cement Association of Sweden, research and the industrial picture had changed. The hypothetical oxides had largely given place to the actual chemical combinations that had been found to be present in the clinker. Regulated cooling of clinker had been introduced as a means of controlling the glass content, and hence several properties of the cement which are affected by the presence of the undercooled liquid. X-ray techniques had supplemented the microscope for certain work, and a beginning had been made in the better understanding of internal structure by the use of X-ray methods. Thermal studies had solved many anomalies of setting, hardening and retardation, and some light was being thrown upon the action of pozzolanas, accelerators and admixtures.

To-day the ability to detect and measure small temperature differentials has been greatly extended by the use of new electronic instruments capable of rapid and automatic recording of minute changes in energy levels. By the use of the thyratron tube, temperature control may be far more precise and reliable than heretofore. Brogue believes that we are entering a new era in cement research, and he predicts that the cement industry, supported by electronic and spectroscopic tools in the skilled hands of investigators in an increasing number of laboratories, will reach in the next decade a new level in the character, quality and usefulness of its product.

Another very valuable paper is that by Harold H. Steinour, which deals with the extremely complex reactions of cement hydration at ordinary temperature. Although much work has been done on this subject, much uncertainty remains, and little is definitely known. It is known that calcium hydroxide is formed by the reaction of tricalcium silicate, but the reactions of the other products are not known with such certainty. The separate reactions of the individual clinker compounds are capable of accounting in large measure for the rates and ultimate values of the strength development and heat liberation of cement paste, but this does not rule out the possibility of some interaction. He states that the nature of the combination may be more physical than chemical, but we do not know.

Many useful practical points are brought out in the paper by F. E. Jones on the physical structure of cement products and its effect on durability. Strength should be adequate for the purpose, not necessarily very high. Generally speaking, aggregates of high open-pore porosity are likely to have low frost resistance, because of the ease with which they take up water. The importance of particle shape in determining the quality of concrete appears to be very high. For equal work done in consolidation, a rounded aggregate gives a concrete of much lower open-pore porosity than a crushed rock aggregate consisting of angular and flaky particles, but it seems doubtful whether greater care in making can compensate for an aggregate which is poor in this respect. The main difficulty with angular and flaky particles lies in the fact that the workability is lower and this means that the water/cement ratio must be raised to increase workability, so that more work will be required in compaction.

The higher water/cement ratio gives concrete of lower strength, while in practice not enough extra work is done to compact the mix properly, giving concrete of higher porosity and lower frost resistance. With angular and flaky particles there is greater tendency to interlock in positions from which no extra amount of work in consolidation may dislodge them, giving voids which are difficult to fill.

A polished glassy type of aggregate would be expected to give poor adhesion, and a very rough surface poor workability. While this suggests contradictory requirements for the best kind of surface texture, it may be that a dull surface, as opposed to a polished one is evidence of a sufficiently rough texture to give a good mechanical key to the cement paste and that otherwise the particle should be preferably rounded.

Avoidance of stress in a mortar or concrete caused by differential movement of the hydrated cement paste and aggregate theoretically requires equality in moisture movement. From this point of view, the nearer the moisture movement of the aggregate approaches that of the hydrated cement, the better; however, moisture movement of most igneous rocks and of limestones is very small. That of sandstone is fairly high but is still only about one-third that of hydrated cement.

Significance of the properties of the aggregates, both in themselves and in relation to those of the cement paste is apparent, particularly where concrete products are used in positions where they are subjected to frost action. It may be possible eventually to base a scheme for classification of aggregates regarding suitability for concrete on an assessment of the relative importance of various properties, but much remains to be done.

Chemical aspects of the durability of cement products are covered in a paper by T. Thorvaldson. He refers to the discovery by John Smeaton, through his studies connected with the rebuilding of

the Eddystone Lighthouse (1756-1759), that a limestone must contain a considerable proportion of clayey matter to produce the best hydraulic lime, which he considered to be a milestone on the road to the production of durable cement. Smeaton combined his discovery and the common knowledge of the use of pozzolanic materials to make a durable mortar.

Smeaton's problem of producing a building material highly resistant to the action of sea water became increasingly important among maritime nations. At the beginning of this century many national committees had been appointed to investigate and report on the problems involved. Many of the failures reported were peculiar to reinforced concrete, but deterioration of plain concrete was not uncommon. Damage occurred rarely at levels where the concrete was continually submerged and most frequently between high water neap tides and spring tides, or just above the high water level.

There was general agreement that if sea water penetrated mass concrete, disintegration might follow, and that such action was more pronounced in warmer seas than in northern latitudes, where the effect of alternate freezing and thawing and attrition by ice were major factors. It was, however, very difficult to estimate the relative roles of physical and chemical action as each accentuates the effect of the other. A surface layer weakened by chemical action is easily removed by abrasion or may spall due to frost action, presenting a new surface for chemical attack. Physical attrition may thus mask, yet intensify, chemical action.

Great emphasis is placed on the need for a dense concrete of low porosity. The hope that a concrete completely impermeable to sulphates could be produced by using a very rich mix, probably led the Committee of the Institution of Civil Engineers to state "that properly constituted Portland cement concrete, employed as it should be, may be relied on to produce *sound and permanent* work."

"Investigations on marine structures do not supply much evidence on the effect of the chemical composition of the cement within the Portland cement range. Gary has reported that concrete blocks made from a Portland cement containing 7.6 per cent of alumina and ferric oxide showed practically no effect after immersion for 15 years in tanks of sea water, while similar blocks made from a cement containing 9.6 per cent of the combined oxides disintegrated in 10 years. Substitution of trass for a portion of the latter cement is reported to have increased its resistance.

Many claims are made for improvement through the use of pozzolanic materials and slag cements. Results obtained with pozzolanas are far from consistent, which is not surprising when we consider the great difference in composition, physical properties and chemical activity of such materials, and possible variations with richness of mix, amount of additive, conditions of exposure and composition of the cement.

Pozzolanic materials are so variable that one cannot expect any general statement to be applicable to them all. The beneficial action is supposed to be due mainly to combination with the lime liberated during hydration of the cement with the formation of stable cementing products. Among the benefits claimed for their use in concrete are: improved workability and less segregation and bleeding; increased durability in sulphate waters; increased water-tightness and reduced tendency for lime to leach out; somewhat higher tensile strength; lower heat of hydration and less cracking in mass concrete; prevention of damage by alkali-aggregate reaction; saving in the cost of cement.

There are also some disadvantages, namely: some loss of early compressive strength, although this may be regained at later ages; less resistance to erosion, weathering and to alternate freezing and thawing, although it is claimed that this can be counteracted by air-entraining; slightly greater expansion on wetting and contraction on drying. Lately a new artificial pozzolan, fly ash (*see page 444*), has come into use and claims have been made for elimination of some of the disadvantages of natural pozzolanas.

Shrinkage of Concrete

A paper by T. W. Parker on the constitution of aluminous cement brings out the important point that this technique was in its infancy at the time of the first symposium on the chemistry of cements and plasters in 1918. Lack of supplies of bauxite during World War II caused British manufacturers to make use of a substitute derived from two waste products, dross from aluminium furnaces, and "red mud" from aluminium manufacture. The process has been described by Hussey. In practice it did not prove possible to convert completely to the use of this material although mixtures of it with natural bauxite were used. Cements containing only the synthetic material without natural bauxite were very fast, or even flash setting, this being the defect which prevented complete use of the material. The investigation by the Building Research Station was aimed at determining the cause of rapid setting. Work since then has shown various points at which the wartime work might have been used to greater effect if the later knowledge had been available at the time, but some of the data are of interest.

The disadvantages of the shrinkage of cement are well known and attempts have been made to counteract this shrinkage by bringing opposing factors into play. This and other points are brought out in the paper by H. Lafuma on expansive cements. This type of cement is prepared from a mixture comprising: Portland cement, which imparts its particular properties to the final product; sulpho-aluminate clinker, which is the expansion agent; blast furnace slag, the stabilizing agent, the slow action of which enables the expansion to take place besides absorbing the excess of sulphate of lime. The composition of the three constituents, their relative proportions, and their fineness are the principal factors whose influence should be considered with regard to obtaining the required expansion.

The disadvantages of the shrinkage of concrete in buildings hardly needs stressing; one of the more obvious results is the formation of cracks that will enable aggressive agents in the atmosphere or water to reach the interior of the concrete and the reinforcing steel. Shrinkage will also cause internal stresses inside the concrete and make it more brittle. Finally, it is an important disturbing element in the design of reinforced concrete structures.

To eliminate shrinkage entirely it would be desirable to produce a swelling equal to the shrinkage at any given moment, and this would mean that swelling should take place during the drying period, which seems to be impossible. Consequently, it was necessary to adopt the following approximate method: swelling, exceeding the amount of shrinkage, is produced for a period of time lasting as long as possible, so that later contraction on drying would offset the original swelling. The method applies to cement a phenomenon first taken advantage of in connection with building plasters in which one of the constituents—anhydrous plaster—produces a certain amount of expansion that compensates the shrinkage of the hemihydrate.

Materials that may be used as expansion agents are lime, magnesia and calcium sulpho-aluminate. Le Chatelier has pointed out that expansion is closely linked with hydration in the solid state without any previous solution: it is the result of the powdered condition of the hydrates formed, producing an apparent increase in volume that would prove detrimental to the mechanical strength of the concrete if it were left entirely free and unrestrained. Excessive expansion could result in complete disintegration of the concrete mass.

The need for obtaining a controllable expansion that will remain constant with time practically enforces the use of sulpho-aluminate as an expansion agent, but there is still the possibility of using it under various forms since there is a certain latitude in the choice of the source and the amounts of alumina, calcium sulphate and lime required for its production. The first expansion agent to give satisfactory practical results was a sulpho-aluminate clinker.

There is a wide difference between expansive and non-shrinking cements, because it is easier to ensure a given amount of expansion than to compensate for the normal amount of shrinkage. This is due to the conditions of placing. When expansive cement is used, expansion is produced by systematic wetting of the concrete, so that it will be sufficient to use a cement with a small excess swelling. Wetting of the concrete is stopped when the desired amount of expansion has been almost reached and, after a few hours, swelling will stop at the required limit. But the same technique could not be applied to non-shrinking cement and it is more difficult to control the wetting conditions, and thus to control the expansion.

The problem of the large-scale manufacture of a specialized product of this type is very difficult, although it is extremely interesting from a technical point of view. There will obviously be a very limited market for this type of cement, so that its manufacture does not make a great commercial appeal. Commercial firms producing these cements do so without much financial incentive and it is therefore essential that architects and builders should appreciate that cement manufacturers are doing very good pioneering work in trying to solve problems of shrinkage.

The fact that modern masonry cement in the United States is passing through a period of development which trends towards increased uniformity of constitution, with predictable performance, is brought out in a paper by Charles E. Wuerpel. The impetus towards change and improvement grew mainly from trouble experienced in the mortar in a large single-storey warehouse in the Middle West. This building has a floor area of about 1,525,000 square feet, was of clay-brick faced concrete-block bearing wall construction. The specification laid down that the mortar should contain equal parts Portland cement and lime. However, the contractor obtained permission to use a "masonry cement," alleged to consist of a blend of equal parts of Port-

(*Continued on page 447*)

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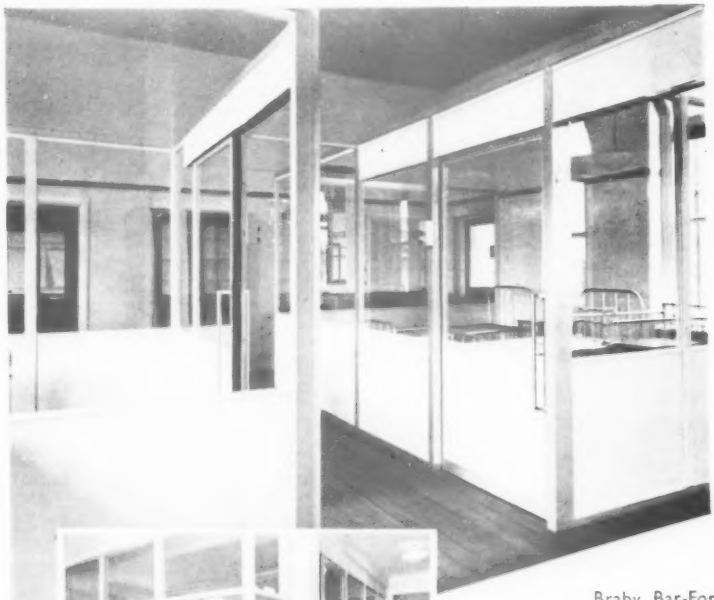

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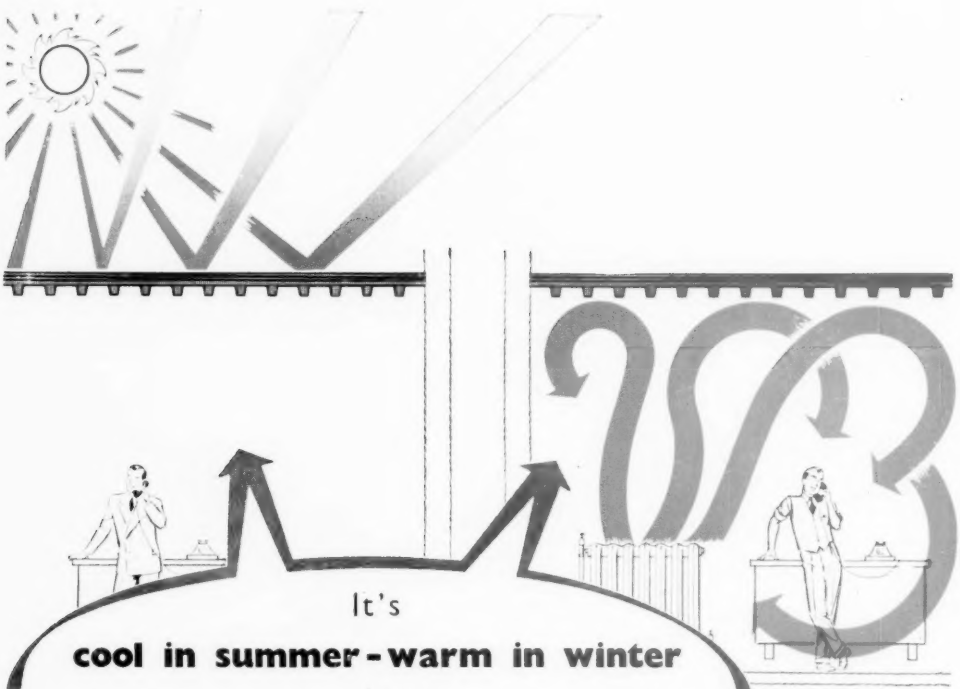

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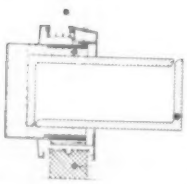

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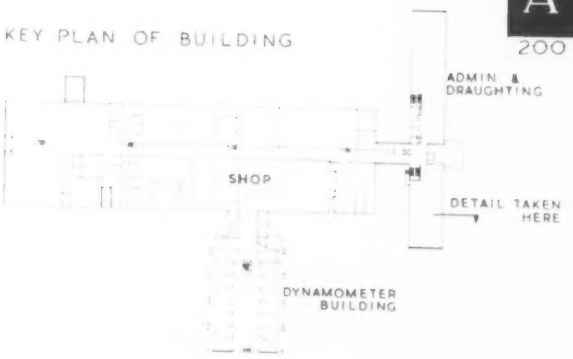

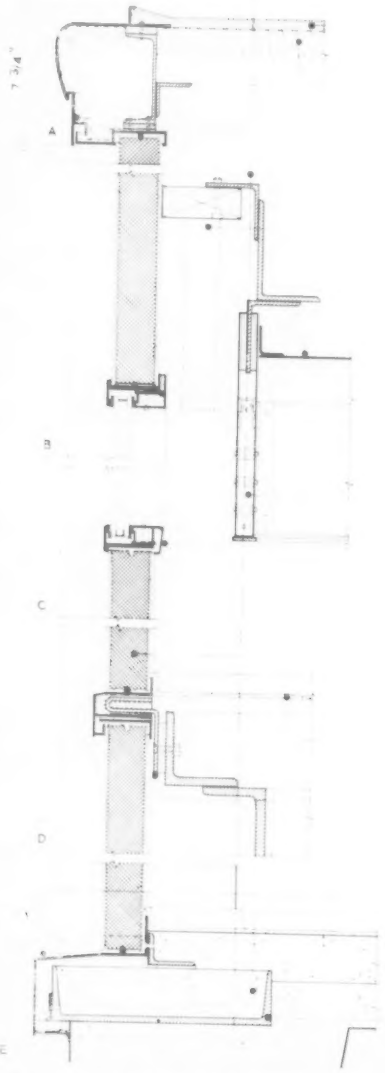

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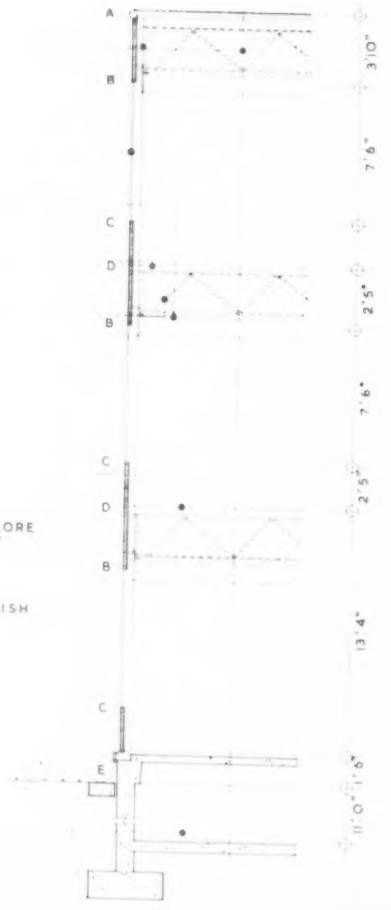

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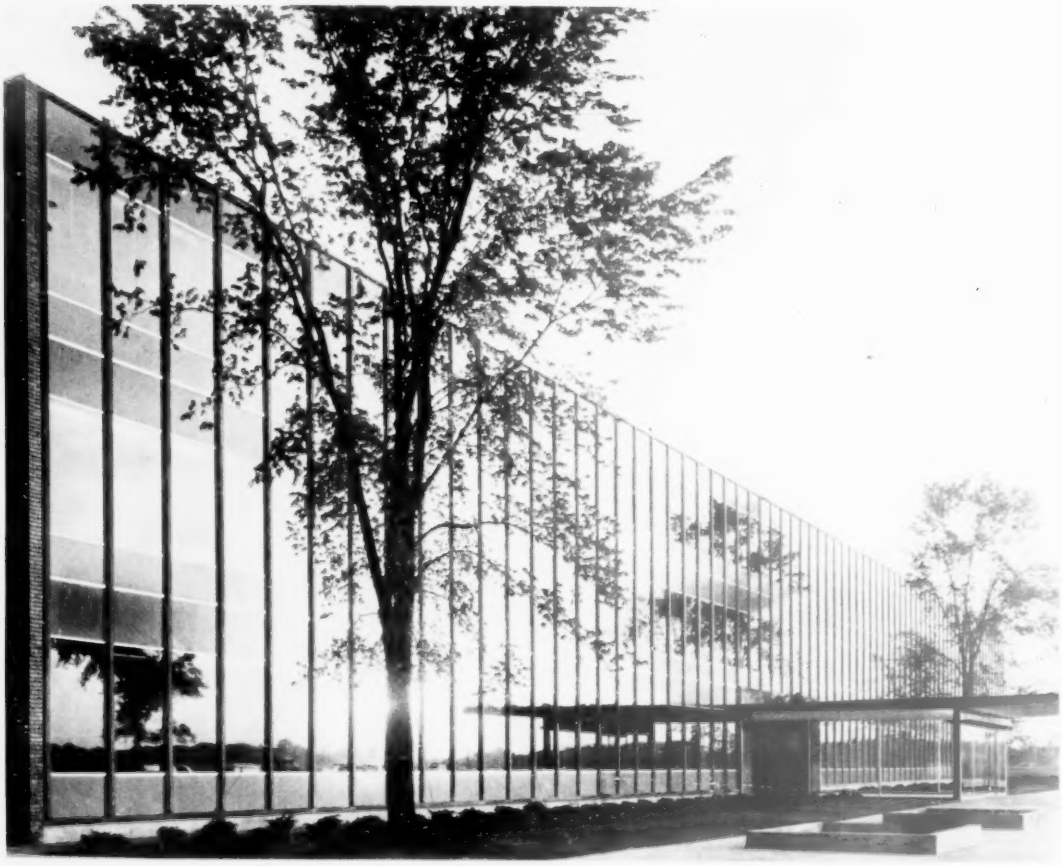
SECTION SCALE 1" = 8'0"



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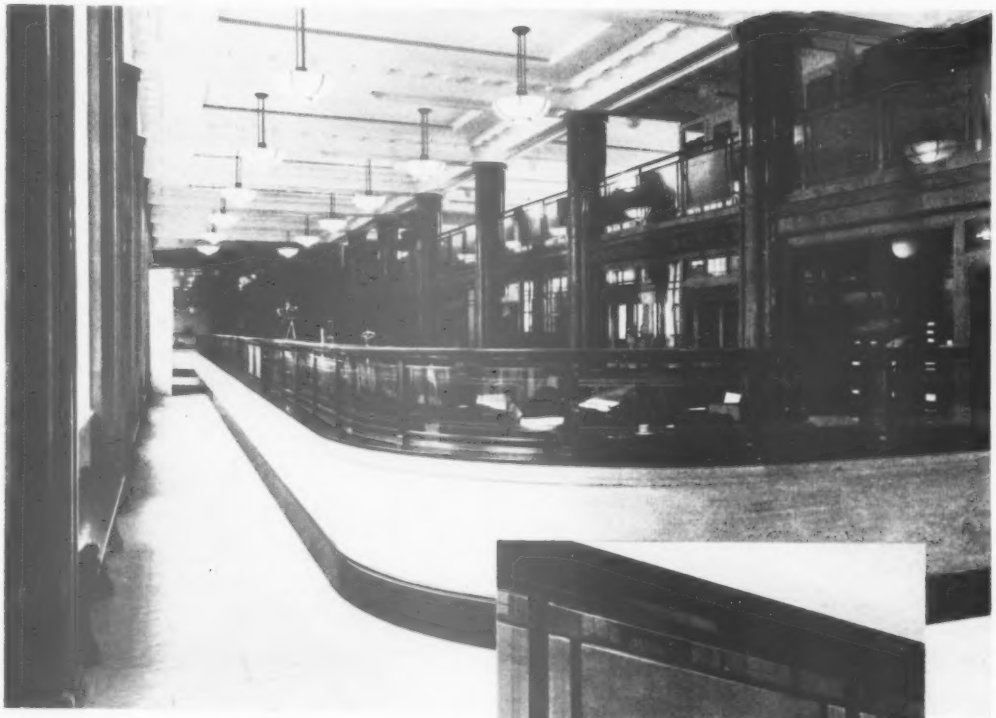

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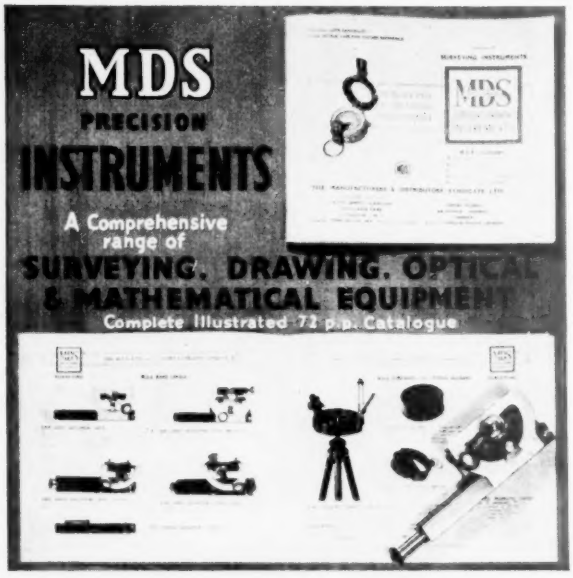

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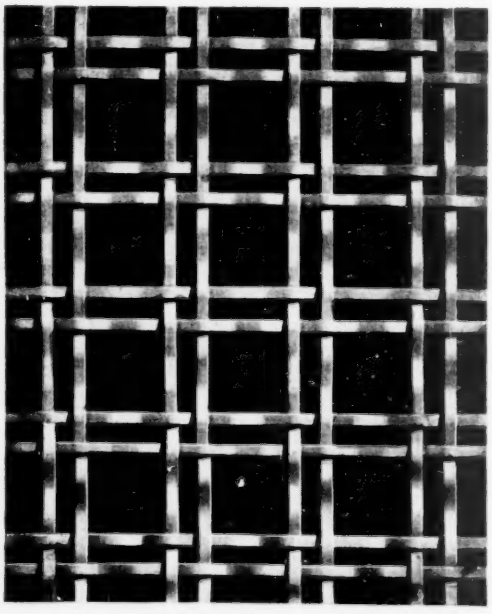


HARCO RIBBON WIRE

The artistic effect of Harco Ribbon Wire renders it particularly suitable for use where care of design and appointment are of major importance. Architects will appreciate that it not only screens the unsightly, but allows free circulation of air. The patterns in which Ribbon Wire can be woven, make it the perfect selection for Lift Shaft Enclosures, Ventilating Panels, Radiator Covers, Electric Heater Covers, etc. Illustration shows Pattern No. 1376 W. Other Patterns and full particulars in Catalogue A 744.

Harvey

G. A. Harvey & Co. (London) Ltd. Woolwich Road, London, S.E.7

(*Continued from page 446*)

land cement and hydrated dolomitic lime. The building was finished in the early summer of 1950, and during the autumn and winter of 1951 there was strong evidence of expansion, which, by the spring of 1952, had become very severe. This expansion resulted from the delayed hydration of the free magnesia as the exposed wall became saturated with rain and melting snow during the first winter.

The cause of this serious expansion was the lime component. This emphasizes one of the main reasons for the wide substitution of limestone ground to an impalpable powder for lime in modern cement produced by most of the makers of Portland cement. It has been proved that limestone interground with Portland cement produces a very fine powder, which contributes towards stability both from the physical and chemical aspects. Introduction of an air-entraining agent in the grinding process adds to the grindability of the solids, contributing greatly enhanced properties of plasticity, extendability, and water retentiveness to the mortar. It is to the myriad of very fine, widely disseminated air bubbles which strongly resist coalescence that major credit is due for the excellent working, spreading and binding qualities of Portland masonry cement.

A co-operative series of tests was carried out in connection with masonry cement in the higher type mortars specified in A.S.T.M. C 270-51T. These tests were carried out on 16 masonry cements at four laboratories, each participating laboratory furnishing to each of the other laboratories a representative sample of masonry cement. It was found that shrinkage did not vary to an appreciable extent in any of the mixtures and that reduction in volume after 28 days of continuous drying is small. Since all the mixtures have elasticity in proportion to their masonry cement content, with equal shrinkage, it seems reasonable to conclude that rupture of bond due to shrinkage would be much less likely to occur as the masonry cement content increases in relationship to the total cement content. This is important because masonry cement is used most generally as the only cementing agent in a masonry mortar.

The development of cements for special uses in the United States is covered in a paper by Myron A. Swayze. In 1925 there were only two kinds of cement covered by specification in that country, both specifications dating back to 1904. To-day, counting air-entraining varieties as separate types, there are at least sixteen different cements in which Portland cement clinker is the main ingredient. Of these, all but one are covered by some sort of specification.

For large mass concrete structures, such as gravity dams, it was discovered more than thirty years ago that serious internal cracking was caused by high heats of hydration in normal Portland cement, particularly when this heat was not removed by artificial means. Enterprising research workers under the leadership of Hubert Woods attacked this problem from the basis of lowering the rate of heat evolution by control of composition. The Tennessee Valley Authority found that less reduction in heat evolution was needed for their smaller dams, and they set up a specification which was very similar to the present Type II cement.

The great advantages of air-entrainment in producing high resistance to frost action in concrete were becoming increasingly evident in the late 1930s. The Federal Specifications Board delayed action until 1945, when they consolidated all five types of both plain and air-entraining cements into a single specification. At first, resin was interground with cement without neutralization, and it was soon found that the arbitrary amounts specified gave varying amounts of air in the concrete, depending upon the amounts of alkali which the particular cements in use might contain. This deficiency was overcome by neutralization of the resin with caustic soda before addition, and by control of the amount added through an air-entraining test. The best air-entraining agents are probably pine resins, but all should be neutralized with caustic soda, in order that their action with high and low alkali cements will be the same. Any pine resin should be equally suitable, selection being mainly determined by price, and the same applies for the derivatives of tall oil.

The principle of air-entrainment applies equally to all types of Portland cement and otherwise as far as increased resistance to frost action is concerned. There are also other advantages to air-entrainment in very moderate amounts which have not yet been generally appreciated. For years the cement industry in the United States has had a large number of admixtures accompanying its products into the concrete market, all designed to improve workability or some other property. It is noteworthy that the present air-entraining cements do not require such aids.

Very small quantities of air-entraining agents are required to promote workability, freedom from segregation and freedom from bleeding in concrete. The amounts for such purposes are only a third to a fifth of that needed to produce air required for maximum frost resistance. Concrete strengths are improved rather than lowered by these small additions, except in the case of very rich mixtures, and it is believed that eventually all American cements will contain trace quantities of these materials.

Use of pozzolanic materials, either as a Portland-pozzolana cement or as a blend of the two materials at the concrete mixer, is to-day gaining ground in the field of mass concrete. In 1949, shipments of Portland-pozzolona cement exceeded 1,100,000 barrels. The pozzolana in these products consists mainly of calcined shale. A relatively new development along this line is the use of fly ash (see also pages 444 and 446) by the Bureau of Reclamation in the construction of the Hungry Horse Dam. This use of fly ash, a waste product from power stations, has stimulated promotion of this material by the power companies as a partial replacement of Portland cement, because here is an opportunity of converting a liability into a useful asset. The two difficulties of using this material are: the presence of varying amounts of carbon from incompletely burnt pulverized coal, which makes the task of ensuring a definite amount of air-trained concrete almost impossible. The second difficulty can be expected with the ash from coals containing limestone as part of the ash, which may cause trouble on hydration.

ROLT HAMMOND

PLASTERBOARD PRICES

A reduction is being made in the price of Gypsum Plasterboard, the general effect of which is that all prices of Wallboard, Baseboard and Lath are decreased by ½d per sq. yard.

The reduced prices will take effect in respect of materials despatched by the Plasterboard manufacturers, as from October 1.

CORRESPONDENCE

Continued from page 427

Shows (Oxford, Cambridge, Newton Abbot, also Royal Welsh Shows) in co-operation with the B.C.C.F. and C.A.C.A. The construction is completely standardized and quantities are available for each of the standard layouts. These details are available free of charge, but if it be considered that any advantage would accrue from such a course it would, as your correspondent says, be easy to make a British Standard for this type of building.

Further Standardization

While the proposals recently submitted by the B.C.C.F. for precast r.c. Dutch barns with pitched roofs are not fully dimensional, they nevertheless lay down a standard frame centre, three spans and two heights.

To imagine that full standardization would benefit the farmer is an over-simplification of the question, at any rate so far as precast concrete is concerned. For reasons of size and weight, concrete has a restricted economic delivery area. Any new theoretical standard which involved every specialist manufacturer scrapping or altering moulds would increase, not reduce, cost and would not be a service to the farming community. On the other hand, if, as is the case, individual manufacturers standardize their productions in conformity with essentials nationally laid down in British Standard Specifications then users have all the benefits of standardization and mass production without complete uniformity.

It is possible that the phraseology of the drafts both for haybarns and general purpose farm buildings may have mislead your correspondent, and possibly others, into thinking that every building is "bespoke tailored," whereas in fact each specialist manufacturer has a range of "off the peg" buildings for which he carries the moulds, if not actual stocks of the components.

Precast r.c. portal-frame buildings are competitive in price with the fully standardized M.A.F. scheme and, moreover, provide clear head room and eliminate maintenance of trusses. Many specialist manufacturers offer precast concrete panels for cladding with blocks or bricks as alternatives, while asbestos-cement sheeting is standard for roofing.

In regard to cowhouse equipment, proposals have been submitted by the B.C.C.F. for British Standards for stall divisions, mangers and standings.

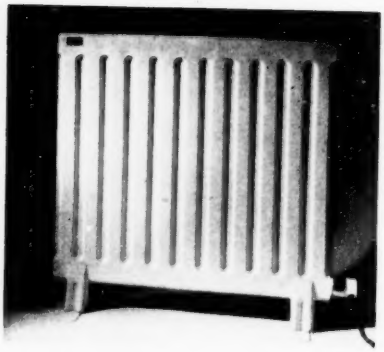
Finally, the following observations may be made:—

The specialist firms, the B.C.C.F. and the C.A.C.A. are in close touch with the farming community, also the Ministry of Agriculture, their technical advisory officers and the M.M.B.

In addition the C.A.C.A. runs a special training course every year for agricultural interests, the B.C.C.F. co-operating in providing some of the lecturers and in preparation of notes.

While it will be gathered from these Notes that the B.C.C.F. does not consider "Dutch Uncle's" proposals would achieve the ends he has in view, no hard and fast decisions have been taken and the matter will be kept under review. At the present time the major need is for better supplies of reinforcing steel in the range of diameters, together with arrangements for carrying a working stock on the lines of the M.A.F. scheme, and negotiations are continuing to achieve these.

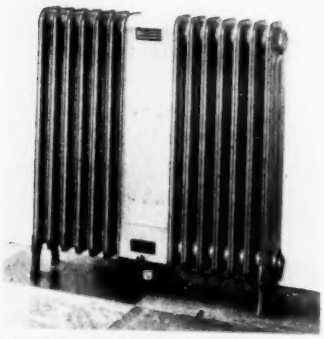
I am, etc.,
R. W. PARKS,
Secretary.



SERVICES
HEATING
B3 27

There appears to be a new complaint known as T.V. chill. The manufacturers of this electrically operated mobile radiator claim that televiewers can prevent "T.V. chill" by using this radiator which also has the advantage of not flickering like a coal fire. The radiator is of course equally useful in bedrooms, halls etc.

The unit is of pressed steel and is oil filled. The heating element is totally enclosed. Standard radiators in different sections and various sizes are available in cream or bronze; alternatively they may be obtained with a priming coat only, ready for decorating to match a given colour scheme.



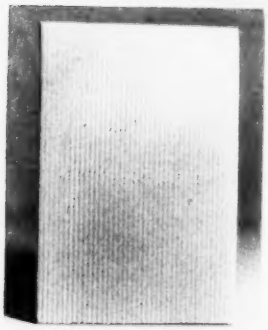
SERVICES
HEATING
B3 28

A new addition to the range of radiators made by the manufacturers of B3 27 is this oil-filled gas-operated model.

This model is designed for use in country districts where main supplies are not readily available. Operation is by Butane gas—the radiator being plugged direct to the gas container with normal tap control.

The radiator is made from several welded sections of pressed steel and is oil filled. The base is fitted with an enclosed noiseless gas burner. Copper coils inside the radiator circulate the oil to diffuse the heat. There is no exposed flame.

The radiator is available for immediate delivery in two sizes at £15 19s 6d and £18 9s 6d respectively. Finish is in gold bronze.

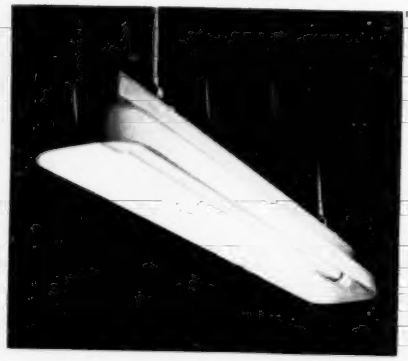


FINISHES
GLASS ETC.
D1 4

This is the latest addition to the existing range of coloured wall finishes in "Vitrolite."

The new shade, which is known as "Cream," extends the colour combinations of this material.

Panels are suitable for either internal or external application. The surface has a ribbed effect which can, of course, be used vertically or horizontally.



SERVICES
LIGHTING
B1 57

The interest in this illustration lies in the new use of a known material. Hitherto Polyvinyl Chloride has been widely known in its flexible forms. Here it is seen in rigid form as a pressed lighting fitting.

Advantages claimed for the material thus used are mechanical strength, high reflectivity and good resistance to chemical attack.

Rigid P.V.C. is available in various colours (and white) and in different thicknesses. But because of its high strength a thickness of 1/16in has been found adequate for lighting fittings.

No part of the fitting must be at more than 55° centigrade, the most likely applications are therefore with fluorescent fittings.

MOSAICS

The names and addresses of manufacturers of any item illustrated in MOSAICS, together with more detailed information relating to their products—including price and availability—will be forwarded to readers on request.

Letters should quote the serial number and be addressed to:

The Editor,
The Architect and Building News,
Dorset House,
Stamford Street, S.E.1.

Please mark the envelope MOSAICS.

WATER PIPES FOR AGRICULTURAL USES

The comparative merits of different types of small diameter water pipes used in connection with rural water supplies, particularly by farmers, are discussed in the Report of the Working Party on Small Diameter Water Pipes* published on September 30.

The working party, which was set up in April, 1950, at the Ministry of Health (which was at that time the Department dealing with water supplies) was not given any formal terms of reference. At their first meeting they decided to deal only with pipes of 2in diameter or less and to report only on pipes for outdoor use.

The report includes information about the nature, cost and properties of the different kinds of small pipes which might be used for rural water supplies. No attempt has been made to relate the findings to the supply position for the different kinds of pipes, which is constantly changing. Special emphasis is laid on the need to select pipes which will resist corrosion caused either by the nature of the soil in which they are laid or by the water which they carry.

Among the conclusions reached are:

Galvanized steel pipes can be used without risk for non-corrosive waters and soils, but should not be used where rapid corrosion of ferrous metals is to be expected. Where corrosion is known to be slight and where pipe trenches are likely to remain reasonably dry, such pipes may be used, although with the risk that some part of the pipe-line may need future replacement.

Steel pipes coated internally and externally with bitumen and sheathed externally are likely to withstand corrosive conditions satisfactorily provided the coating of pipes, joints and specials remains continuous throughout.

Copper tubing can be used under all conditions except to carry very acid water or in exceptionally corrosive soils.

Asbestos cement pipes, if of 1¼in diameter or over, are suitable under all conditions except in highly sulphated soils, provided metal joints, bolts and specials are adequately protected against corrosion and the pipes are evenly bedded.

Polythene pipes (plastic) may be expected to prove satisfactory for cold water supplies in all soils and for all waters, if made to British Standard specifications which, it is understood, are being prepared.

The Working Party also stress the importance of doing everything possible to avoid the waste of water due to faulty pipes or pipe-laying.

* *Report of the Working Party on Small Diameter Water Pipes, published by H.M. Stationery Office, price 6d net, 7½d post free.*

CONTRACT • NEWS •

Notes below give basic data of contracts open under locality and authority which are in bold type. References indicate : (a) type of work, (b) address for application. Where no town is stated in the address it is the same as the locality given in the heading, (c) deposit, (d) last date for application, (e) last date and time for submission of tenders. Full details of contracts marked ★ are given in the advertisement section.

OPEN

BUILDING

ABRAM U.C. (a) 24 dwellings, Bickershaw Estate. (b) Messrs. J. C. Prestwich and Sons, Bradshawgate Chambers, Leigh, Lancs. (d) Oct. 13.

* * *

ALCESTER R.C. (a) 2 houses at Wixford. (b) Messrs. F. B. Andrews and Son, 95, Colmore Row, Birmingham. (c) 2gns. (e) Oct. 29.

* * *

ANDOVER B.C. (a) 38 houses, Harrow Way site, with site works, etc. (b) Borough Surveyor, "Beech Hurst," Weyhill Road. (c) 2gns. (e) Nov. 6.

* * *

BEDFORDSHIRE C.C. (a) Fire station with drill and hose drying tower, Sandy. (b) County Architect, Shire Hall, Bedford. (d) Oct. 11.

* * *

BERKSHIRE C.C. (a) Pair of police houses with office and garages at East Challow. (b) County Architect, Wilton House, Parkside Road, Reading. (c) 2gns. (e) Oct. 17.

* * *

BIRMINGHAM C.C. (a) (Contract 203) 6 houses at Swinford Road, Selly Oak; (Contract 256) 26 houses at Fairfax Road, West Heath; (Contract 224) 71 dwellings on the Hawkesley Farm Estate, West Heath; and (Contract 274) 9 flats at George Road, Erdington. (b) City Engineer, Civic Centre, 1. (c) 2gns. each contract. (d) Oct. 13.

* * *

CARDIFF C.C. (a) Lavatory block at Bryn-y-Don Approved School, Dinas Powis, Glam. (b) City Surveyor, City Hall. (c) 2gns. (e) Oct. 23.

* * *

CRAYFORD U.C. (a) Block of 8 shops, 6 maisonnettes, 4 flats, stores, messroom, 4 garages, Forest Road, Slade Green. (b) Engineer and Surveyor, Town Hall. (c) 2gns. (e) Oct. 29.

* * *

CROYDON B.C. (a) 16 houses in Macclesfield/Albert Roads and Ritchie Road. (b) Borough Engineer, Town Hall; immediately. (c) 3gns.

* * *

DURHAM C.C. (a) 12 aged persons' bungalows off Sunderland Road Estate. (b) City Engineer, Town Hall. (c) 2gns. (e) Oct. 17.

* * *

DURHAM C.C. (a) Fire station at Peterlee. (b) County Architect, Court Lane. (d) Oct. 15.

* * *

HERNE BAY U.C. (a) (Contract No. 3) 12 houses, Greenhill Estate. (b) Messrs. A. S. Wilson and Partners, 8, Storey's Gate, London, S.W.1. (c) 2gns. (d) Oct. 14.

* * *

HUNTINGDON C.C. (a) Conversion of ex-W.L.A. hostel to provide annexe to Sawtry Infants' School. (b) County Architect, County Buildings, Huntingdon. (e) Oct. 17.

* * *

ILFORD B.C. (a) Lavatory block at Downshall Secondary School. (b) Borough Engineer, Town Hall. (c) 1gn. (e) Oct. 21.

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LANCASHIRE C.C. (a) (1) additional classroom accommodation at Westleigh Secondary School, Leigh; (2) 1 police house, office and garage at Newton Road, Lowton, 2 pairs at Livesey Branch Road, Feniscowles, 2 pairs at Rookwood Avenue, Chorley, 1 pair at Carr Head Estate, Poulton-le-Fylde, and 2 pairs at Back Lane, Hutton; (3) additional classrooms at Whitefield Stand Girls' Grammar School. (b) County Architect, County Hall, Preston. (d) Oct. 11.

* * *

LEEK U.C. (a) (Contract 8) 16 houses, Haregate Estate. (b) Council's Architect, Town Hall. (c) 2gns. (e) Oct. 25.

* * *

LEYLAND U.C. (a) (Contract No. 8) 36 houses, Wade Hall Estate. (b) Engineer and Surveyor, Council Offices. (c) 2gns. (e) Oct. 30.

* * *

LINCOLN C.C. (PARTS OF KESTEVEN). (a) 1 pair of houses at Byards Leap, Cranwell; 1 house and office at Folkingham Road, Billingborough; 1 house and office at Martin; 1 house and office at Station Lane, Swinderby; 1 house and office at Wilsford; and 1 house and office at Witham-on-the-Hill, for police. (b) County Architect, County Offices, Sleaford. (e) Oct. 20.

* * *

***LONDON—CAMBERWELL B.C.** (a) 3-storey block of 8 dwellings, Site No. 63, Ondine Road. (b) Town Clerk, Town Hall, Peckham Road, S.E.5. (c) 2gns. (e) Nov. 4. See page 33.

* * *

LONDON—GREENWICH B.C. (a) Underground reinforced concrete control centre, etc. (b) Borough Engineer, Town Hall, S.E.10. (c) 2gns. (e) Nov. 4.

* * *

LONDON—STEPNEY B.C. (a) 56 flats and 8 shops, Globe Road, E.1. (b) Borough Engineer, Municipal Offices, 227-233, Commercial Road, E.1. (c) 10gns. (e) Oct. 22.

* * *

LONDON—WEST HAM B.C. (a) (Contract 179) 93 3-storey flats and 24 2-storey houses at Butchers Road, E.16. (b) Borough Architect, 70, West Ham Lane, E.15. (c) 2gns. (d) Oct. 25.

* * *

MALVERN U.C. (a) 18 bungalows, Pound Bank Estate. (b) Council's Surveyor, Council House. (c) 2gns. (e) Oct. 27.

* * *

OXFORD C.C. (a) 52 houses, Cowley Airfield, Cowley, Oxford. (b) City Architect, Town Hall. (d) Oct. 11.

* * *

RYDE B.C. (a) 6 pairs of houses, Jellicoe Road, Binstead Estate. (b) Borough Surveyor, 5, Lind Street, Ryde, I.W. (c) 2gns. (e) Oct. 18.

* * *

SAFFRON WALDEN R.C. (a) 4 houses at Wicken Bonhunt, Essex. (b) Council's Clerk, Council Offices, Debden Road. (e) Oct. 18.

* * *

ST. ALBANS R.C. (a) 52 dwellings at Park Street Lane Estate, Park Street, near St. Albans, comprising (1) 24 for the R.D.C. and (2) 28 for Colney Housing Society, Ltd. (b) (1) Architect's Office, 43, Lattimore Road, St. Albans, and (2) C. Sweet, 48, Bedford Row, London, W.C.1. (c) 2gns each scheme. (e) Oct. 18.

* * *

ST. AUSTELL R.C. (a) (1) 1 pair of houses at Harmony Place, Roche; (2) 2 pairs at Highfield Avenue, St. Columb. (b) Engineer and Surveyor, "Trevarna," 12, Carlyon Road. (c) 2gns each contract. (e) Oct. 29.

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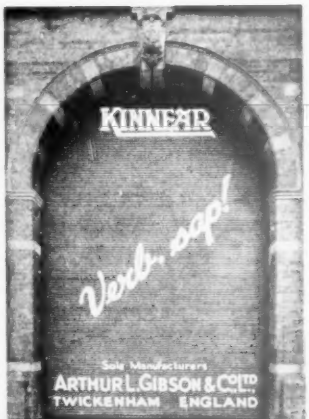

SMETHWICK B.C. (a) 3 blocks of 8 maisonettes at South Road, Little Moor Hill, and Broomfield, Smethwick. (b) Borough Engineer, Council House. (c) 2gns, crossed cheque payable to "Borough Treasurer," Smethwick. (e) Nov. 8.

* * *

SOMERSET C.C. (a) 4 classrooms, cloakrooms and offices, staff block, assembly hall, kitchen, for completion of Keynsham junior school. (b) County Architect, Park Street, Taunton. (c) 2gns. (d) Oct. 13 (with assurance that applicant has necessary financial and material resources and organization).

* * *

STAVELEY U.C. (a) 40 houses, Inkersall Green Estate, Brimington. (b) Engineer and Surveyor, Council Offices, Lowgates. (c) 1gn. (d) Oct. 18.

* * *

WEMBLEY B.C. (a) Erection of a building, comprising 2 houses, administration block and welfare block, public conveniences, etc., at Carpenders Park Cemetery, near Watford, Herts. (b) Borough Treasurer, Town Hall. (c) 2gns.

PLACED

Notes on contracts placed state locality and authority in bold type with (1) type of work, (2) site, (3) name of contractor and address, (4) amount of tender or estimate. † denotes that work may not start pending final acceptance, or obtaining of licence, or modification of tenders, etc.

BUILDING

DERBY CORPORATION. (1) Secondary school. (2) Mackworth Estate. (3) Ford and Weston, Ltd., Osmaston Road, Derby. (4) £145,499.

* * *

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* * *

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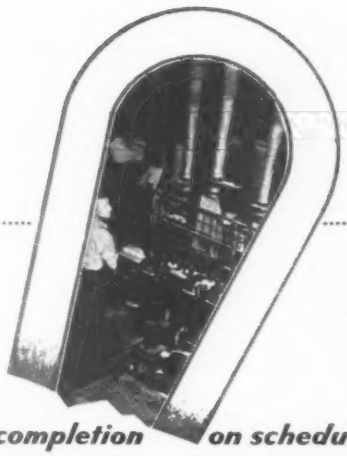

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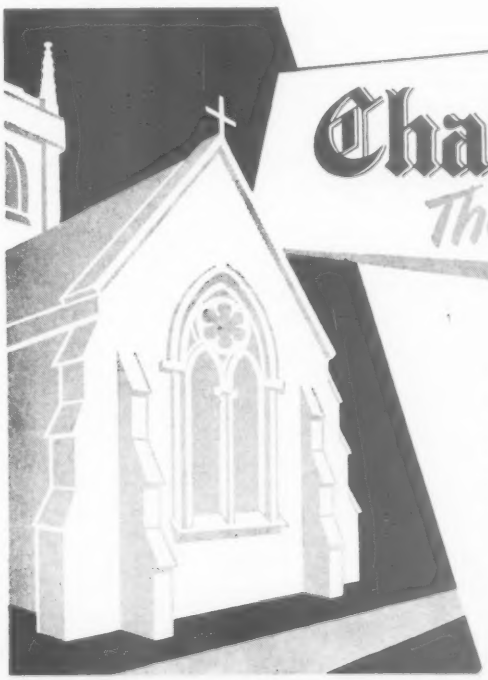

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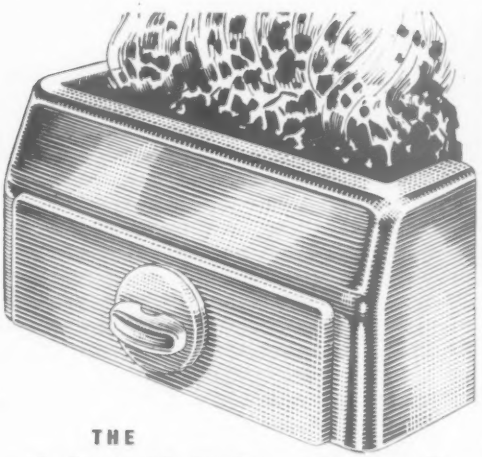

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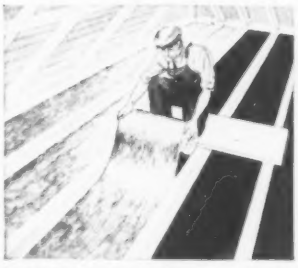

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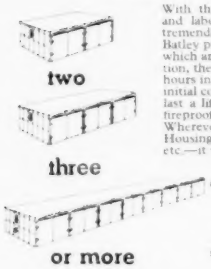

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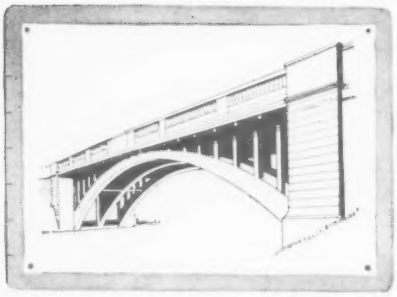

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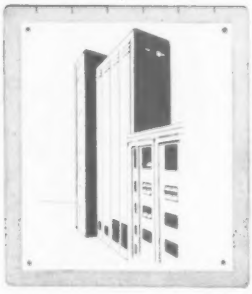

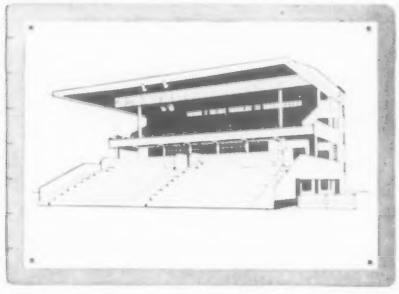

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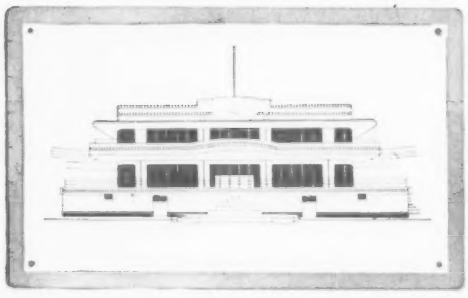

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